PESTICIDES ABSTRACTS

January 1980 — Vol. 13, No. 1
Abstracts 80-0001-0300
PSTAB 13(01): 001-057(1980)

Annual List of Periodicals

U.S. ENVIRONMENTAL PROTECTION AGENCY

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES
CHEMICAL INFORMATION DIVISION
Rm. E447, 401 M Street, S.W.
Washington, D.C. 20460

PESTICIDES ABSTRACTS (formerly Health Aspects of Pesticides Abstract Bulletin) is a monthly publication of the Technical Services Division of the Office of Pesticide Programs, Environmental Protection Agency.

The purpose of this publication is to foster current awareness of the major worldwide literature pertaining to the effects of pesticides as defined in the Table of Contents. The publication represents a monthly review of more than 2,000 primary and secondary sources. A list of periodicals from which articles have been abstracted appears annually in the January issue. Subjects and authors of abstracted articles are cross-referenced in quarterly and annual indexes. Reprint requests should be directed to the author of the complete article.

Publication of an abstract, annotation, or citation does not imply endorsement by the Environmental Protection Agency of the original article or of commercial materials, equipment, or processes mentioned therein.

CONTENTS

Volume 13 January 1980 No. 1

Page

List of Periodicals i

General 1
(News items, letters, and editorials appearing in scientific and technical journals; information on production and use; and other items of general interest)

Monitoring and Residues 6
(levels of pesticides in people or nonexperimental animals or in water, air, soil, food, feed, and other consumer products)

Epidemiology, Prevention and Treatment 15
(Frequency and distribution of pesticide poisoning in man or nonexperimental animals and treatment of clinical cases; morbidity and mortality; safety measures; decontamination; disposal of containers and wastes; legislation and regulations)

Toxicology and Pharmacology 19
(Toxicity studies in man and animals; effects on cells; organs, and systems; metabolic studies, biochemistry, interactions; antidotes and other treatment; mode of action. Ordinarily, articles dealing with efficacy studies are not included.)

Analysis 50
(preparation of samples; analytical methods; instrumentation)

PESTICIDES ABSTRACTS

Preface

Included in this issue is a list of sources from which at least one article was abstracted for publication in Volume 12 (1979); however, more than 2500 primary serials and secondary sources, books, and non-periodical publications are screened. Journal titles are abbreviated according to the format of the *Bibliographic Guide for Editors and Authors*, available from Chemical Abstracts Service. Japanese publications are listed by the Hepburn romanization of the complete title followed by its English equivalent. For additional convenience, English titles of Japanese periodicals are listed separately and cross-referenced.

ABH AKAD WISS DDR
ABSTR ANNU MEET AM SOC MICROBIO
ACS SYMP SER
ACTA ALIMENT POL
ACTA BIOL MED GER
ACTA CHIR SCAND SUPPL
ACTA DERM VENEREOL
ACTA FAC RERUM NAT UNIV COMENIA
ACTA GENET MED GEMELLOL
ACTA HAEMATOL POL
ACTA HISTOCHEM
ACTA HISTOCHEM CYTOCHEM
ACTA HYDROCHIM HYDROBIOL
ACTA MED SCAND
ACTA MICROBIOL ACAD SCI HUNG
ACTA NEUROPATHOL
ACTA OBSTET GYNECOL SCAND
ACTA PAEDIATR SCAND
ACTA PEDIATR JPN
  SEE NIPPON SHONIKA GAKKAI ZASSHI
ACTA PHARMACOL TOXICOL
ACTA PHYSIOL ACAD SCI HUNG
ACTA PHYTOPATHOL ACAD SCI HUNG
ACTA SOC OPHTHALMOL JPN
  SEE NIPPON GANKAGAKKAI ZASSHI
ADAS Q REV
ADV MOD TOXICOL
ADV PESTIC SCI
ADV PHARMACOL THER
AERONAUT J
AEROSOL AGE
AFINIDAD
AGRIC BIOL CHEM
AGRIC CHEM SEE NOYAKU
AGRIC CHEM MON SEE KONGETSU NOYAKU
AGRIC ENG
AGRIC RES
AGRIC RES J KERALA
AGROCHEMIA
AGROKHIMIYA
AGRON J
AICHE SYMP SER
AICHI IKA DAIGAKU IGAKUKAI ZASSHI (J AICHI MED UNIV ASSOC)
AKITA J RURAL MED
  SEE AKITA-KEN NOSON IGAKKAI ZASSHI
AKITA-KEN NOSON IGAKKAI ZASSHI (AKITA J RURAL MED)
ALEXANDRIA J AGRIC RES
AM BEE J
AM IND HYG ASSOC J
AM J CLIN PATHOL
AM J EPIDEMIOL
AM J HOSP PHARM
AM J HUM GENET
AM J PATHOL
AM J PHYSIOL
AM J PUBLIC HEALTH
AM J VET RES
AM LAB
AM POTATO J
AM WATER WORKS ASSOC J
AMBIO
AN EDAFOL AGROBIOL
AN INST CERCET PROT PLANT ACAD
ANAL CHEM
ANAL CHEM SEE BUNSEKI KAGAKU
ANAL CHIM ACTA
ANAL LETT
ANALYSIS SEE BUNSEKI
ANALYST (LONDON)
ANAT REC
ANN AGRON
ANN ANAT PATHOL
ANN APPL BIOL

ANN ARID ZONE
ANN BIOL ANIM BIOCHIM BIOPHYS
ANN CHIM
ANN FALSIF EXPERT CHIM
ANN INTERN MED
ANN MED VET
ANN NUTR ALIMENT
ANN NY ACAD SCI
ANN OCCUP HYG
ANN PHARM FR
ANN SCLAVO
ANN SURG
ANN UNIV MARIAE CURIE SKLODOWSK
ANNU R KAGOSHIMA PREF I PUB HLTH
SEE KAGOSHIMA-KEN EISEI KENKYUSH*
ANNU R NAGASAKI PREFECT INST
ANNU R OKINAWA PREF
SEE OKINAWAWA-KEN KOGAI-EISEI KENKYUS
ANNU R TOKYO RES LAB PUB HLTH
SEE TOKYO-TORITSU EISEI KENKYUSHO N*
ANNU R YAMAGUCHI PREF
SEE YAMAGUCHI-KEN EISEI KENKYUSHO NENPO
ANNU REP INST IND MED
ANZ SCHAEDLINGSKD PFLANZENSCH
AORN J
APPL ENVIRON MICROBIOL
APPL PHARMACOL SEE OYO YAKURI
AR AGRIC EXP STN MIMEOGRAPH SER
ARCH ANAT MICROSC MORPHOL EXP
ARCH BELG MED SOC HYG MED TRAV
ARCH BIOCHEM BIOPHYS
ARCH BIOL MED EXP
ARCH DERMATOL
ARCH DERMATOL RES
ARCH ENVIRON CONTAM TOXICOL
ARCH ENVIRON HEALTH
ARCH EXP VETERINAERMED
ARCH FR PEDIATR
ARCH GESCHWULSTFORSCH
ARCH IMMUNOL THER EXP
ARCH INT PHARMACODYN THER
ARCH INT PHYSIOL BIOCHIM
ARCH INTERN MED
ARCH LEBENSMITTELHYG
ARCH MAL PROF
ARCH NEUROL
ARCH PATHOL LAB MED
ARCH TOXICOL
ARCH VET ITAL
ARH HIG RADA TOKSIKOL
ARKH ANAT GISTOL EMBRIOL
ARQ INST BIOL SAO PAULO
ARS PUBL
ARZNEIM FORSCH
ASA SPEC PUBL (AM SOC AGRONOMY)
ATTI ACCAD NAZ LINCEI CL SCI FI
AUDOBON
AUST J CHEM
AUST J EXP AGRIC ANIM HUSB
AUST SUGAR J
AVIAN DIS
AVIAT SPACE ENVIRON MED
BANBURY REPORT
BEITR TABAKFORSCH
BEITR TABAKFORSCH INT
BERL MEUNCH TIERARZTL WSCHR
BIOCHEM BIOPHYS RES COMMUN
BIOCHEM J
BIOCHEM PHARMACOL
BIOCHEM SOC TRANS
BIOCHEMISTRY SEE SEIKAGAKU
BIOCHIM BIOPHYS ACTA
BIOINORG CHEM
BIOL CONSERV
BIOL NAUKI (MOSCOW)
BIOL RUNDSCH
BIOLOGIA (BRATISLAVA)
BIOLOGICO
BIOMED MASS SPECTROM
BIOORG KHIM
BIOPHYS J
BIOSCIENCE
BOCHU KAGAKU (SCI PEST CONTR)
BR J CANCER
BR J CLIN PHARMACOL
BR J EXP PATHOL
BR J IND MED
BR J PHARMACOL
BR J UROL
BR J VENER DIS
BR MED J
BRAIN RES
BROMATOL CHEM TOKSYKOL
BRUXELLES MED
BULL ACAD NAT MED (PARIS)
BULL ACAD VET FR
BULL CANCER
BULL ENTOMOL RES
BULL ENTOMOL SOC AM

BULL ENVIRON CONTAM TOXICOL
BULL EXP BIOL MED
BULL INF INST BELGE AMELIOR BER
BULL JPN SOC SCI FISH
  SEE NIPPON SUISAN GAKKAISHI
BULL NAGANO RES INST HLTH POLLU
BULL WHO
BUNSEKI
BUNSEKI (ANALYSIS)
BUNSEKI KAGAKU
BUNSEKI KAGAKU (ANAL CHEM)
BUNSEKI KAGAKU (JPN ANALYST)
BYULL EKSP BIOL MED
BYULL VSES INST EKSP VET
C R ACAD BULG SCI
C R ACAD SCI SER D
C R SOC BIOL
CA AGRIC
CAN ENTOMOL
CAN J ANIM SCI
CAN J BIOCHEM
CAN J BOT
CAN J COMP MED
CAN J GENET CYTOL
CAN J MICROBIOL
CAN J PHYSIOL PHARMACOL
CAN J PLANT SCI
CAN J SOIL SCI
CAN J ZOOL
CANCER (PHILADELPHIA)
CANCER LETT
CANCER RES
CANCER TREAT REP
CAS LEK CESK
CEREAL FOODS WORLD
CESK HYG
CESK PEDIATR
CHANG-KUO NONG YEA HUA
  (J CHIN AGRIC CHEM SOC)
CHEM ANAL (WARSAW)
CHEM AUSTRALIA
CHEM BIOL INTERACT
CHEM CANADA
CHEM ENG (BUDAPEST)
CHEM ENG NEWS
CHEM IND (LONDON)
CHEM PHARM BULL (TOKYO)
CHEM REGULATION OF PLANTS
  SEE SHOKUBUTSU NO KAGAKU
  CHOSETSU
CHEM SOC REV
CHEMOSPHERE
CHEMTECH
CHESAPEAKE SCI
CHEST
CHIM IND
CHIRURGIIA (MOSCOW)
CHIRYO
CHIRYO (J THERAPY)
CHROMATOGRAPHIA
CHRONOBIOLOGIA
CIBA CLIN SYMP
CIBA FOUND SYMP
CIRC RES SUPPL
CITRUS IND
CLAYS CLAY MINER
CLEVELAND CLIN Q
CLIN BIOCHEM
CLIN CHEM
CLIN CHIM ACTA
CLIN ELECTROENCEPHALOGR
  SEE RINSHO NOHA
CLIN EXP PHARMACOL PHYSIOL
CLIN GENET
CLIN HAEMATOL
CLIN MED
CLIN NEUROL
  SEE RINSHO SHINKEIKEIGAKU
CLIN ONCOL
CLIN PERINATOL
CLIN PHARMACOL THER
CLIN RES
CLIN SCI MOL MED
CLIN TOXICOL
COMMUN SOIL SCI PLANT ANAL
COMP BIOCHEM PHYSIOL C
COMP PHYSIOL ECOL
CONGENITAL ANOMALIES
  (SENTEN IJO)
CONSUMER REP
CONTACT DERMATITIS
CRIT REV FOOD SCI NUTR
CRIT REV TOXICOL
CROPS SOILS
CROPS SOILS MAG
CURR SCI
CYTOBIOLOGIE
DEF VEG
DERM BERUF UMWELT
DERMATOL MONATSSCHR
DEV BIOL SCI
DISS ABSTR INT B

DOKL AKAD NAUK SSSR
DOKL BOLG AKAD NAUK
DOPV AKAD NAUK UKR RSR B
DRUG CHEM TOXICOL
DRUG INTELL CLIN PHARM
DRUG METAB DISPOSIT
DRUGS CHEM TOXICOL
DTSCH LEBENSM RUNDSCH
DTSCH MED WOCHENSCHR
DTSCH TIERAERZTL WOCHENSCHR
ECOLOGY
ECOTOXICOL ENVIRON SAF
EGESZSEGTUDOMANY
EISEI DOBUTSU
(JPN J SANIT ZOOL)
EISEI KAGAKU
(J HYG CHEM)
EIYO TO SHOKURYO
(JPN J FOOD NUTR)
EKOLOGIYA
EKSP VODN TOKSIKOL
ELECTROENCEPHOLOGR CLIN NEUROPH
EMERG MED
EMERGENCY MED
ENVIRON BIOL FISH
ENVIRON CONSERV
ENVIRON ECOL CHEM
SEE SEITAI NO KAGAKU
ENVIRON ENTOMOL
ENVIRON EXP BOT
ENVIRON HEALTH PERSPECT
ENVIRON HEALTH REP
SEE KANKYO YO HOKEN REPORT
ENVIRON IMPACT WATER CHLOR PROC
ENVIRON INT
ENVIRON MANAGE
ENVIRON POLLUT
ENVIRON POLLUT COUNTERMEASURES
SEE KOGAI TO TAISAKU
ENVIRON RES
ENVIRON SCI RES
ENVIRON SCI TECHNOL
ENZYME
EPA J
ESSAYS BIOCHEM
ESTUARIES
ESTUARINE COASTAL MAR SCI
EUR J CANCER
EUR J CLIN INVEST
EUR J CLIN PHARMACOL
EUR J PHARMACOL
EXCERPTA MED INT CONGR SER
EXP CELL RES
EXP GERONTOL
EXP HORTIC
EXP MOL PATHOL
EXP PATHOL
EXP PATHOL
EXPERIENTIA
FARM TIJDSCHR BELG
FARM ZH
FARMACO ED PRAT
FARMAKOL TOKSIKOL (MOSCOW)
FARMATSIYA (MOSCOW)
FATS AND OILS (GRASAS ACEITES)
FEBS LETT
FED PROC FED AM SOC EXP BIOL
FEMS MICROBIOL LETT
FERTIL STERIL
FIZIOL ZH (KIEV)
FLEISCHWIRTSCHAFT
FOLIA BIOL
FOLIA HISTOCHEM CYTOCHEM
FOOD COSMET TOXICOL
FOOD POLICY
FOOD SANIT RES
SEE SHOKUHIN EISEI KENKYO
FOOD TECHNOL AUST
FOOD TECHNOL N Z
FORSCH BERAT REIHE C
FORTSCHR MED
FORUM STAEDTE HYG
FRESENIUS Z ANAL CHEM
FUKUSHIMA IGAKKAI ZASSHI
(FUKUSHIMA MED J)
FUKUSHIMA MED J
SEE FUKUSHIMA IGAKKAI ZASSHI
GA AGRIC EXP STN RES BULL
GANKA RINSHO IHO
(JPN REV CLIN OPHTHALMOL)
GANN
GARTENBAU
GAS WASSER ABWASSER
GASTROENTEROLOGY
GEN PHARMACOL
GENETICS
GENETIKA
GESUNDE PFLANZ
GIG SANIT
GIG TR PROF ZABOL
GIT FACHZ LAB
GRADINAR LOZAR NAUKA

GRASAS ACEITES (SEVILLE)
SEE FATS AND OILS
GROWTH
GRUNDFOERBAETTRING
HAEMATOL BLUTTRANSFUS
HAGASAKI-KEN EISEI KOGAIKENKYU
HAUTARZT
HIDROL KOZL
HIDROLOG KOZL
HIDROTEHNICA
HIROSHIMA DAIGAKU IGAKU ZASSHI
(HIROSHIMA UNIV MED MAG)
HIROSHIMA J MED SCI
HIROSHIMA UNIV MED MAG
SEE HIROSHIMA DAIGAKU IGAKU ZASSHI
HYDROBIOL J
IAEA BULL
IARC ANN REP
IARC SCI PUBL
IG MOD
IG SANITA PUBBLICA
IGAKU NO AYUMI
IMMUNOLOGY
IN VITRO
IND ALIMENT (PINEROLO, ITALY)
IND CONSERVE
IND HEALTH
IND WASTES (CHICAGO)
INDIAN AGRIC SCI
INDIAN CHEM J
INDIAN J AGRIC CHEM
INDIAN J AGRIC SCI
INDIAN J ANIM SCI
INDIAN J BIOCHEM BIOPHYS
INDIAN J ECOL
INDIAN J ENVIRON ANAL CHEM
INDIAN J ENVIRON HEALTH
INDIAN J EXP BIOL
INDIAN J PHYSIOL PHARMACOL
INDIAN J POULT SCI
INDIAN J POULT SCO
INIS ATOMINDEX
INQUINAMENTO
INT ARCH OCCUP ENVIRON HEALTH
INT BIODETERIOR BULL
INT J BIOCHEM
INT J CANCER
INT J DERMATOL
INT J ENVIRON ANAL CHEM
INT J ENVIRON STUD
INT J PHARM
INT MED INFANTS
SEE SHONI NAIKNAIKA
INT PEST CONTROL
INTERDISCIP SCI REV
IR J MED SCI
ISOTOPENPRAXIS
ISR J MED SCI
IWATE IGAKU ZASSHI
(J IWATE MED ASSOC)
IZV AKAD NAUK GRUZ SSR SER KHIM
IZV AKAD NAUK KIRG SSR
IZV AKAD NAUK SSSR SER BIOL
IZV TIMIRYAZEVSK S'KH AKAD
J AGRIC CHEM SOC JPN
SEE NIPPON NAGAI KAGAKU KAISHI
J AGRIC FOOD CHEM
J AGRIC UNIV P R
J AGRIC UNIV PR
J AICHI MED UNIV ASSOC
SEE AICHI IKA DAIGAKU IGAKUKAI ZASSHI
J AIR POLLUT CONTROL ASSOC
J AM ANIM HOSP ASSOC
J AM CHEM SOC
J AM INDUST HYG ASSOC
J AM MED ASSOC
J AM MED WOMEN'S ASSOC
J AM OIL CHEM SOC
J AM SOC HORTIC SCI
J AM VET MED ASSOC
J ANAL TOXICOL
J ANAT
J ANIM SCI
J APPL BACTERIOL
J AQUA PLANT MANAGE
J ASSOC OFF ANAL CHEM
J AUST INST AGRIC SCI
J BACTERIOL
J BIOL CHEM
J CANCER RES CLIN ONCOL
J CHIN AGRIC CHEM SOC
SEE CHANG-KUO NONG YEA HUA
J CHROMATOGR
J CHROMATOGR SCI
J COLLOID INTERFACE SCI
J COMBUSTION TOXICOL
J COMPARAT PATHOL
J DENT RES
J ECON ENTOMOL
J ELISHA MITCHELL SCI SOC

J ENTOMOL RES
J ENVIRON ENG DIV
J ENVIRON PATHOL TOXICOL
J ENVIRON POLLUT CONTROL
SEE KOGAI TO TAISAKU
J ENVIRON QUAL
J ENVIRON SCI
J ENVIRON SCI HEALTH B
J FISH BIOL
J FISH RES BOARD CAN
J FLUORINE CHEM
J FOOD HYG SOC JPN
SEE SHOKUHIN EISEIGAKU ZASSHI
J FOOD PROCESS PRESERV
J FOOD PROT
J FOOD SAF
J FOOD SCI
J FOOD SCI TECHNOL
J GEN MICROBIOL
J GEN PHYSIOL
J HIGH RESOLUT CHR CHR COMMUNIC
J HIRNFORSCHUNG
J HISTOCHEM CYTOCHEM
J HYG CHEM
SEE EISEI KAGAKU
J HYG EPIDEMIOL MICROBIOL IMMUN
J IMMUNOL
J INDIAN CHEM SOC
J INORG NUCL CHEM
J INST WATER ENG SCI
J INVEST DERMATOL
J IR MED ASSOC
J IWATE MED ASSOC
SEE IWATE IGAKU ZASSHI
J JPN ASSOC RURAL MED
SEE NIPPON NOSON IGAKKAI ZASSHI
J JPN SOC INT MED
SEE NIPPON NAIKAGAKKAI ZASSHI
J JPN SOC INTERN MED
SEE NIPPON NAIKAGAKKAI ZASSHI
J KANS ENTOMOL SOC
J LAB CLIN MED
J LIQUID CHROMATOGR
J LUMIN
J MED ASSOC OKAYAMA
SEE OKAYAMA IGAKKAI ZASSHI
J MED SOC TOHO UNIV
SEE TOHO IGAKKAI ZASSHI
J NAGOYA CITY UNIV MED SCH
SEE NAGOYA SHIRITSU DAIGAKU
J NARA MED ASSOC
SEE NARA IGAKU ZASSHI
J NATL CANCER INST
J NATL SCI COUNC SRI LANKA
J NEUROCHEM
J NEUROCYTOL
J NEUROPATHOL EXP NEUROL
J NUCL AGRIC BIOL
J NUTR
SEE RINSHO EIYO
J OCCUP MED
J ORG CHEM
J ORNITHOL
J PATHOL
J PEDIAT PRACT
SEE SHONIKA SHIINRYO
J PESTIC SCI
SEE NIPPON NOYAKU GAKKAISHI
J PHARM BELG
J PHARM PHARMACOL
J PHARMACOKINET BIOPHARMAC
J PHARMACOL EXP THER
J PHYSIOL (PARIS)
J POLYM SCI POLYM LETT ED
J RANGE MANAGE
J SCI FOOD AGRIC
J SCI IND RES
J SOC INT MED
SEE NIPPON NAIKAGAKKAI ZASSHI
J SOC OCCUP MED
J STEROID BIOCHEM
J THEOR BIOL
J THERAPY SEE CHIRYO
J TOXICOL ENVIRON HEALTH
J TOXICOL SCI
J ULTRASTRUCT RES
J WATER POLLUT CONTROL FED
J WILDL MANAGE
JPN ANALYST
SEE BUNSEKI KAGAKU
JPN ENVIRON WHITEPAPR FUKUSHIMA
JPN J CLIN DERMATOL
SEE RINSHO HIFUKA
JPN J ECOL
SEE NIPPON SEITI GAKKAISHI
JPN J FOOD NUTR
SEE EIYO TO SHOKURYO
JPN J HYG
SEE NIPPON EISEIGAKU ZASSHI
JPN J IND HEALTH
SEE SANGYO IGAKU

JPN J LEGAL MED
SEE NIPPON HOIGAAKU ZASSHI
JPN J PHARMACOL
JPN J PUBLIC HEALTH
SEE NIPPON KOSHU EISEI ZASSHI
JPN J RURAL MED
SEE NIPPON NOSON IGAKKAI ZASSHI
JPN J SANIT ZOOL
SEE EISEI DOBUTSU
JPN REV CLIN OPHTHALMOL
SEE GANKA RINSHO IHO
JUSTUS LIEBIGS ANN CHEM
KAGAKU NO RYOIKI
KAGOSHIMA-KEN EISEI KENKYUSHO NENPO (ANNU R KAGOSHIMA PREF PUB H*
KANKYO HOKEN REP
(ENVIRON HEALTH REP)
KEM TIDSKR
KHIM SEL'SK KHOZ
KIDNEY INT
KINKI DAIGAKU IGAKU ZASSHI
(MED J KINKI UNIV)
KLIN MED (MOSCOW)
KLIN WOCHENSCHR
KOGAI HAKUSHO
(WHITE PAPER ON ENVIRON POLLUT)
KOGAI TO TAISAKU
(J ENVIRON POLLUT CONTROL)
KONGETSU NOYAKU
(AGRIC CHEM MON)
(PESTIC MON)
KONSERVN OVOSHCHESUSH PROMST
KOREAN J INTERNAL MED
SEE TAEHAN NAEKWA HOKHOE CHAPCHI
KOSHU EISEI
(PUBLIC HYGIENE)
KRIM FORENSISCHE WISS
KYUSHU BYOGAICHU KENKYU KAIHO
(PROC ASSOC PLANT PROT)
LA AGRIC
LAB ANIM SCI
LAB INVEST
LAIT
LAKARTIDNINGEN
LANCET
LANDWIRTSCH FORSCH
LIFE SCI
LLOYDIA
LUFTHYG SILIKOSEFORSCH
MAG KEM FOLY
MAGY KEM LAPJA
MAGY TUD
MAMMAL REV
MANUF CONFECT
MAR BIOL
MAR ENVIRON RES
MAR FISH REV
MAR POLLUT BULL
MED CLIN NORTH AM
MED J AUST
MED J AUSTRALIA
MED J KINKI UNIV
SEE KINKI DAIGAKU IGAKUZASSHI
MED PR
MED WORLD NEWS
MEDED FAC LANDBOUWWET RIJKSUNIV
METHODS BIOCHEM ANAL
MICROBIOS
MICROBIOS LETT
MICROCHEM J
MIKROBIOL ZH (KIEV)
MIKROCHIM ACTA
MILCHWISSENSCHAFT
MINERVA MED
MITT GEB LEBENSMITTELUNTERS HYG
MN AGRIC EXTN SERV EXTN BULL
MOL PHARMACOL
MON LABOR REV
MONATSH KINDERHEILKD
MONATSH VETERINAERMED
MONOGRAPHS GIOVANNI LORENZINI F
MORBID & MORTAL WKLY RPT
MOSQ NEWS
MUTAT RES
N ENGL J MED
N Y ACAD SCI SCI WEEK
N Z J EXP AGRIC
NACHR DTSCH PFLANZENSCHUTZDIEN
NAGASAKI PREF INT PUB HLTH ANN
SEE NAGASAKI-KEN EISEI KOGAI KENKY
NAGASAKI-KEN EISEI KOGAI KENKY
(NAGASAKI PREF INT PUB HLTH ANN)
NAGOYA SHIRITSU DAIGAKU
(J NAGOYA CITY UNIV MED SCH)
NAHRUNG

NAIKA SHIRIZU
NARA IGAKU ZASSHI
(J NARA MED ASSOC)
NASA AEROSP MED BIOL
NATION'S HEALTH
NATL BUR STAND (U S) SP PUBL
NATL TECH INFO
NATURE (LONDON)
NAUNYN SCHMIEDEBERGS ARCH PHARM
NBS (US) SP
NBS (US) SPEC PUBL
NCI TECH REPORT SERIES
NED TIJDSCHR GENEESKD
NEOPLASMA
NEPHRON
NETH J PLANT PATHOL
NEUROLOGY
NEW SCI
NICHIDAI IGAKU ZASSHI
(NIPPON UNIV MED J)
NIPPON BYOORIGAKKAI KAISHI
(TRANS SOC PATHOL JPN)
NIPPON DAIGAKU IGAKU ZASSHI
NIPPON EISEIGAKU ZASSHI
(JPN J HYG)
NIPPON GANKAGAKKAI ZASSHI
(ACTA SOC OPHTHALMOL JPN)
NIPPON HOIGAKU ZASSHI
(JPN J LEGAL MED)
NIPPON KOSHU EISEI ZASSHI
(JPN J PUBLIC HEALTH)
NIPPON NAIKAGAKKAI ZASSHI
(J SOC INT MED)
NIPPON NOGEI KAGAKU KAISHI
(J AGRIC CHEM SOC JPN)
NIPPON NOSON IGAKKAI ZASSHI
(J JPN ASSOC RURAL MED)
NIPPON NOSON IGAKKAI ZASSHI
(JPN J RURAL MED)
NIPPON NOYAKU GAKKAISHI
(J PESTIC SCI)
NIPPON SEITI GAKKAISHI
(JPN J ECOL)
NIPPON SHONIKA GAKKAI ZASSHI
(ACTA PEDIATR JPN)
NIPPON SUISAN GAKKAISHI
(BULL JPN SOC SCI FISH)
NIPPON UNIV MED J
SEE NICHIDAI IGAKU ZASSHI
NOUV PRESSE MED
NOYAKU (AGRIC CHEM)
NOYAKU BIJINESU (PESTIC BUS)
NRCC/CNRC PUBL #16073
NUOVI ANN IG MICROBIOL
NURSING MIRROR
NUTR CANCER
NUTR REP INT
OCCUPAT HEALTH SAF
OCEAN MANAGE
OCHR PR
OECOLOGIA
OHIO REP
OIKOS
OKAYAMA IGAKKAI ZASSHI
(J MED ASSOC OKAYAMA)
OKINAWA-KEN KOGAI-EISEI
KENKYUSHO NENPO
(ANNU R OKINAWA PREF)
ONCOLOGIA (BUCHAR)
ORG MAGN RESON
ORG MASS SPECTROM
OYO YAKURI
OYO YAKURI (APPL PHARMACOL)
PAK J ZOOL
PANS (PEST ARTIC NEWS SUMM)
PATH RES PRACT
PEDIATR AKUSH GINEKOL
PEDIATR RES
PEDIATRICS
PERGAMON SER ENVIRON SCI
PEST CONTROL
PESTIC BIOCHEM PHYSIOL
PESTIC BUS
SEE NOYAKU BIJINESU
PESTIC MANAGE INSECTIC RESIST
PESTIC MON
SEE KONGETSU NOYAKU
PESTIC MONIT J
PESTIC SCI
PESTICIDES
PHARM WEEKBL
PHARMACHOCHEM LIBR
PHARMACOL RES COMMUN
PHARMACOL THER
PHARMACOL THER A
PHARMACOLOGIST
PHARMAZIE
PHILOS TRANS R SOC LONDON SER B
PHOSPHORUS SULFUR
PHOTOCHEM PHOTOBIOL
PHYSIOL PLANT

PHYSIOLOGIST
PHYTIATR PHYTOPHARM
PHYTOPATHOL Z
PLANT PATHOL
PLANT PROTECT
  SEE SHOKUBUTSU BOEKI
PLANT SOIL
POL ARCH HYDROBIOL
POL J PHARMACOL PHARM
POL J SOIL SCI
POLLUT ATMOS
POLYCYCLIC HYDROCARBONS CANCER
POSTEPY NAUK ROLN
POSTGRAD MED
POULTRY SCI
PRAC LEK
PRACTITIONER
PROC AM ASSOC CANCER RES
PROC ANAL DIV CHEM SOC
PROC ASSOC PLANT PROT
  SEE KYUSKYUSHU BYOGAICHU
  KENKYU KAIHO
PROC AUSTR PHYSIOL PHARMACOL SO
PROC EUR SOC TOXICOL
PROC FLA STATE HORTIC SOC
PROC HUNG ANNU MEET BIOCHEM
PROC INDIAN ACAD SCI B
PROC INDIAN NATL SCI ACAD B
PROC INT SYMP 3RD
PROC N CENT WEED CONTROL CONF
PROC NORTHEAST WEED SCI SOC
PROC OKLA ACAD SCI
PROC R SOC LONDON SER B
PROC SYMP FENITROTHION #16073
PROC WEST SOC WEED SCI
PROCESS BIOCHEM
PROGRESS BIOCHEM PHARMACOL
PRUM POTRAVIN
PRZEGLAD LEK
PUBLIC HEALTH REP
PUBLIC HYGIENE SEE KOSHU EISEI
PULP PAP CAN
PURE APPL CHEM
PYRETHRUM POST
Q REV BIOPHYS
RADIOBIOLOGIYA
RADIOISOTOPES
RASS CHIM
REIHE
REP SHIMANE PREFECT INST PUBLIC
RES COMMUN CHEM PATHOL PHARMAC
RESIDUE REV
REV AGROQUIM TECHNOL ALIMENT
REV BIOCHEM TOXICOL
REV CAN BIOL
REV CHIM (BUCHAREST)
REV ESP ONCOL
REV INT OCEANOGR MED
REV MED SUISSE ROMANDE
REV PRAT
REV SANID HIG PUBLICA
RINSHO HIFUKA
  (JPN J CLIN DERMATOL)
RINSHO NOHA
  (CLIN ELECTROENCEPHALOGR)
RINSHO SHINKEIGAKU
  (CLIN NEUROL)
ROCZ PANSTW ZAKL HIG
S A MED J
SAKH PROM
SAKH SVEKLA
SANGYO IGAKU
  (JPN J IND HEALTH)
SANT PUBLIQUE (BUCUR)
SCAND J GASTROENTEROL
SCAND J WORK ENVIRON HEALTH
SCHWEIZ MED WOCHENSCHR
SCI CULT
SCI PEST CONTR
  SEE BOCHU KAGAKU
SCI PHARM
SCI TOTAL ENVIRON
SCIENCE
SCOTT MED J
SECURITAS
SEIKAGAKU (BIOCHEMISTRY)
SEITAI NO KAGAKU
  (ENVIRON ECOL CHEM)
SENTEN IJO
  SEE CONGENITAL ANOMALIES
SHIKOKU J PUBLIC HEALTH
  SEE SHIKOKU KOOSHUU EISEIGAKU
  ZASSHI
SHIKOKU KOOSHU EISEIGAKU ZASSHI
  (SHIKOKU J PUBLIC HEALTH)
SHOKUBUTSU BOEKI
  (PLANT PROTECT)
SHOKUBUTSU NO KAGAKU CHOSETSU
  (CHEM REGULATION PLANTS)
SHOKUCHO
SHOKUHIN EISEI KENKYO

SHOKUHIN EISEI KENKYO
(FOOD SANIT RES)
SHOKUHIN EISEIGAKU ZASSHI
(J FOOD HYG SOC JPN)
SHONIKA NAIKA
(INT MED INFANTS)
SHONIKA SHINRYO
(J PEDIAT PRACT)
SOIL BIOL BIOCHEM
SOIL SCI
SOIL SCI SOC AM J
SOUTH MED J
SOV MED
ST MARIANNA IKADAIGAKU ZASSHI
(ST MARIANNA MED J)
ST MARIANNA MED J
SEE ST MARIANA IKADAIGAKU ZASSHI
STEROIDS
STUD CERCET BIOCHIM
SUCR BELGE
SUISAN ZOSHOKU
SYMP SKIN INTERN DIS
SYMP USE HERBIC FOR (USDA)
TAEHAN NAEKWA HOKHOE CHAPCHI
(KOREAN J INTERNAL MED)
TAIWAN SUGAR
TALANTA
TECH SCI MUNIC
TECHNOL REV
TEHNOL MASA
TER ARKH
TERATOLOGY
TETRAHEDRON LETT
TEX J SCI
THERAPIE
THERAPIEWOCHE
THORAX
TOB INT
TOB SCI
TOHO IGAKKAI ZASSHI
(J MED SOC TOHO UNIV
TOHOKU J EXP MED
TOKYO-TORITSU EISEI KENKYUSHO
NENPO (ANNU R TOKYO RES LAB
PUB HLTH
TOXICOL ANNU
TOXICOL APPL PHARMACOL
TOXICOL EUR RES
TOXICOL LETT
TOXICOLOGY
TRANS AM FISH SOC
TRANS BR MYCOL SOC
TRANS KANS ACAD SCI
TRANS NEBR ACAD SCI AFFIL SOC
TRANS SOC PATHOL JPN
SEE NIPPON BYOORIGAKKAI KAISHI
TRAV SOC PHARM MONTPELLIER
TRENDS BIOCHEM SCI
TRENDS PHARMACOL SCI
TUMORI
TURRIALBA
TX AGR EXP STN MISC PUBL
TX AGRIC EXP STN MISC PUBL
UGESKR LAEG
UKR BIOKHIM ZH
UKR KHIM ZH
USP KHIM
UZB KHIM ZH
VA J SCI
VAR FOEDA
VESTI AKAD NAVUK BSSR (MINSK)
VESTN DERMATOL VENEROL
VESTN SKH NAUKI KAZ
VET ARH
VET CLIN N AM SMALL ANIM PRACT
VET HUM TOXICOL
VET MED (PRAGUE)
VET MED SMALL ANIM CLIN
VET PARASITOL
VET PATHOL
VET REC
VET RECORD
VETERINARIYA (MOSCOW)
VETERINARSTVI
VIRCHOWS ARCH A
VIROLOGY
VOEN MED SH
VOM WASSER
VOPR MED KHIM
VOPR PITAN
VRACH DELO
WASSERWIRTSCH WASSERTECH
WASTE AGE
WATER & SEWAGE WORKS
WATER AIR SOIL POLLUT
WATER AND WASTE WATER
SEE YOSUI TO HAISU
WATER POLLUT CONTROL
WATER RES
WEED RES

WEED SCI
WEST J MED
WHITE PAPER ON ENVIRON POLLUT
  SEE KOGAI HAKUSHO
WIAD CHEM
WIAD LEK
WIAD PARAZYTOL
WIEN MED WOCHENSCH
WILHELM ROUX ARCH DEV BIOL
WIS MED J
WISS BEITR MARTIN LUTHER U H WI
WISS Z TECH UNIV DRESDEN
WOOD SCI TECHNOL
WORLD HEALTH
WORLD HEALTH - JUNE
WORLD REV NUTR DIET
XENOBIOTICA
YALE J BIOL MED
YAMAGUCHI IGAKU
  (YAMAGUCHI MED J)
YAMAGUCHI MED J
  SEE YAMAGUCHI IGAKU
YAMAGUCHI-KEN EISEI KENKYUSHO
  NENPO (ANNU R YAMAGUCHI PREF)
YOSUI TO HAISU
  (WATER AND WASTE WATER)
YU-KAGAKU
Z ALLG MED
Z ALLG MIKROBIOL
Z CHEM
Z ERKR ATMUNGSORGANE
Z ERNAEHRUNGSWISS
Z GESAMTE HYG IHRE GRENZGEB
Z GESAMTE INN MED IHRE GRENZGEB
Z LEBENSM UNTERS FORSCH
Z NATURFORSCH
Z NATURFORSCH C
Z PFLANZENERNAEHR BODENKD
Z PFLANZENERNAEHR- BODENKD
Z PFLANZENKR PFLANZENSCHUTZ
Z WASSER ABWASSER FORSCH
ZENTRALBL ARBEITSMED ARBEITSSCH
ZENTRALBL BAKTERIOL ABT II
ZESZ NAUK AKAD ROLN TECH OLSZTY
ZESZ PROBL POSTEPOW NAUK ROLN
ZH ANAL KHIM
ZH EVOL BIOKHIM FIZIOL
ZH PRIKL KHIM
ZH VSES KHIM OVA

80-0001. Anonymous **Rats and mice, cancer and toxaphene.** *Am. Fam. Physician* 20(4): 85-86; 1979.

This editorial questions the techniques used to determine the carcinogenicity of many commonly used substances. In particular, concern is voiced over the latest NCI study on toxaphene. It is questioned whether, since the maximum amount of toxaphene residues permitted in food for human consumption is 7 ppm, studies involving excessively large doses (99-1112 ppm) fed to laboratory animals over long periods of time truly measure the carcinogenic potential of this chemical. It is suggested that more attention be paid to quantities ingested and that species-to-species variations in effects be taken into account.

80-0002. Dosman, J. A.; Graham, B. L.; Cotton, D. J. (Div. Pul. Med., Dep. Med., Univ. Hosp., Univ. Saskatchewan, Saskatoon, Saskatchewan S7N 0X0, Canada) **Chronic bronchitis and exposure to cereal grain dust.** *Am. Rev. Respir. Dis.* 120(3): 477-480; 1979 (25 references).

This editorial considers risks to workmen involved in the grain storage and transporting industry. This would include elevator agents, workmen in large terminals, dock workers, bakers, and mill workers. Grain dust contains not only organic substances from various cereal grains, but also contaminants such as silica, bacterial endotoxins, insects, mites, mammalian debris, and chemical substances which are used as herbicides and pesticides during both the growing and transporting activities. Allergic reactions of type I or type III are discussed.

80-0003. Breckenridge, A. M.; Challiner, M.; Mossman, S.; Park, B. K.; Serlin, M. J.; Sibeon, R. G.; Williams, J. R. B.; Willoughby, J. M. T. (Dep. Pharmacol. & Ther., Univ. Liverpool, Liverpool L69 3BX, England) **Cimetidine increases the action of warfarin in man.** *Br. J. Clin. Pharmacol.* 8(4): 392P-393P; 1979 (4 references).

The effects of cimetidine on the kinetics and dynamics of warfarin in man were studied. Seven volunteers were given daily doses of racemic warfarin to prolong prothrombin time (PT). After 2 wk of warfarin administration cimetidine was added for 3 wk at a level of 200 mg 3 times daily and 400 mg at night. Cimetidine was found to prolong PT from 19.4 ± 0.6 sec to 22.9 ± 1.4 sec and to increase plasma warfarin concentration from 0.96 ± 0.11 μg/ml to 1.76 ± 0.19 μg/ml. When cimetidine was discontinued PT and plasma warfarin fell significantly. During the study plasma protein binding to warfarin did not alter significantly. Warfarin and antipyrine clearances were determined for 4 volunteers before and after receiving 400 mg cimetidine 4 times daily for 2 wk. Cimetidine decreased warfarin clearance significantly from 3.40 ± 0.12 ml/min to 2.50 ± 0.26 ml/min. Antipyrine clearance fell significantly from 34.49 ± 2.36 ml/min to 27.03 ± 2.77 ml/min. In the Wistar rat cimetidine produced an increase in zoxazolamine paralysis time and a dose related increase in sleeping time. It was concluded that the anticoagulant effect of warfarin seems to be increased by cimetidine due to inhibition of drug metabolism. The authors recommend that care should be taken in concomitant therapy.

80-0004. Davis, D. E. (Dep. Bot. & Microbiol., Auburn Univ., Auburn, AL 36830) **Dioxin and the Vietnam veteran.** *Bull. At. Sci.* 35(8): 58-59; 1979.

Comments and additional information are presented concerning the possible deleterious effects of dioxin-contaminanted 2,4,5-T herbicides. It is argued that earlier reports on the hazards assocated with the use of 2,4,5-T in this country and in Vietnam may be misleading due to the lack of adequate sampling. Hazards of 2,4,5-T use in the U.S. also may not be comparable to the spraying of Agent Orange in Vietnam, since the dosages sprayed in Southeast Asia were more than 700 times greater than domestic spraying practices. The author points out that neither workers at Dow Chemical, the principle manufacturer of 2,4,5-T, nor the inhabitants of Seveso, Italy, who were exposed to large doses of dioxin in an industrial explosion in 1976, have reported severe adverse effects from the exposure.

80-0005. Vale, G. A. (Tsetse & Trypanosomiasis Control Branch, Dep. Vet. Sci., Causeway, Zimbabwe-Rhodesia) **Field responses of testes flies (Diptera: Glossinidae) to odours of men, lactic acid and carbon dioxide.** *Bull. Entomol. Res.* 69(3): 459-467; 1979 (10 references).

The attractant or repellent nature of human body odor, lactic acid, and carbon dioxide were determined using tsetse flies as the responding organism. The number of flies attracted to an ox was measured when the ox had been sprayed with L-lactic acid. It was noted that the L-lactic acid reduced the number of flies attracted to the ox by half. Body odor of men also depressed by up to 0.8 the number of flies attracted to the ox. Human breath, due to the carbon dioxide content, was mildly attractive to the flies.

80-0006. Anonymous **New journal announcement.** *Cell Biophys.* 1(1): i; 1979.

A new journal, *Cell Biophysics*, has been established. This quarterly publication will cover biophysical methods, instrumentation, and computer based analysis of all cells of biological, immunological, medical, agricultural, and environmental interest. Abstracts of pertinent articles from *Cell Biophysics* will be published in appropriate sections of future issues of *Pesticide Abstracts.*

80-0007. Glaubinger, R. S.; Kohn, P. M.; Remirez, R. (Author address not given) **Love Canal aftermath.** *Chem. Eng. (NY)* 86(23): 86-92; 1979.

The Love Canal disaster and current remedial measures provide a unique opportunity to serve as a model for cleaning up abandoned chemical dumps elsewhere. Analysis of composite samples collected from the southern sector of the former Hooker Chem. Co. waste site revealed 128 priority pollutants, including HCB (hexachloro benzene) α-, β-, and γ-benzene hexachloride (BHC; lindane), heptachlor, and other pesticides or their byproducts. After most of the inhabitants of the area were evacuated, extensive clean-up operations were initiated. A permanent leachate treatment plant, toxic waste collection and containment systems, underground work to install clay caps, and other rehabilitative measures are now in the construction phase. At the federal level, the Love Canal experience has triggered regulaory activity, including proposed EPA rules dealing with chemical disposal sites.

80-0008. WHO Task Gr. Environ. Health Crit. DDT Its Derivatives. (WHO, Geneva, Switzerland) **DDT and its derivatives.** *Environ. Health Criteria (WHO; Geneva)* 9:1-194; 1979 (23 references).

This review discusses health criteria for DDT and its derivatives. Included in the presentation are the physical and chemical properties of the compounds as well as analytical procedures for detecting the compounds in various sample types. The sources of environmental pollution and the transport and distribution of the chemicals by air, wind, water and through bioaccumulation are considered. Exposure levels encountered presently in the environment are described. The metabolism of DDT is discussed along with effects of exposure to DDT on man through both epidemiological and clinical studies. Experimental studies on the effects of DDT are detailed and an evaluation of health risks to man from exposure to these compounds is offered.

80-0009. Kono, R. (Cent. Virus Diagn. Lab., Natl. Inst. Health, Tokyo, Japan) **A review of S.M.O.N. studies in Japan.** In: *Epidemiological Issues in Reported Drug-Induced Illnesses. S.M.O.N. and Other Examples.* Gent, M. and Shigematus, I., eds. (McMaster Univ. Libr. Press: Hamilton, Canada): pp. 121-136; 1978 (69 references).

In this review the appearance of a disease, subacute myelo-optic neuropathy (S.M.O.N.) of unknown etiology, in Japan is described. Symptoms include non-inflammatory, pseudosystemic degeneration involving the peripheral nerves, the posterior and lateral columns of the spinal cord, and the optic nerve, along with abdominal symptons (pain, diarrhea). A research commission formed to determine the cause of the disease could find no evidence for viral or microbial etiology, or for vitamin B_{12} deficiency as a factor. The possibility of pesticides as a cause was eliminated because the incidence of S.M.O.N. in farmers (who would have had the heaviest pesticide exposure) was lower than in other professions. In addition, there were no differences between S.M.O.N. patients and controls in the levels of cholinesterase in sera and red blood cells, and of α- and β-BHC, lindane, dieldrin, p,p'-DDE and p,p'-DDT in fatty tissue. A dramatic decrease on the sale of the drug clioquinol in the incidence of S.M.O.N. occurred following a government ban September, 1970. There is evidence to support the therory of clioquinol as the cause, and there are no findings to contradict this conclusion.

80-0010. Anonymous **New journal announcement.** *Epidemiol. Rev.* 1:vii; 1979.

The new journal, *Epidemiological Review*, is introduced and is dedicated to Neal Nathanson, former editor-in-chief of the *Am. J. Epidemiology*. Topics in the first volume of the *Review* include infectious diseases, other conditions, and general topics. Abstracts of future articles from the *Review* will appear in the sections of *Pesticides Abstracts.*

80-0011. Campion, D. G.; McVeigh, L. J.; Polyrakis, J.; Michaelakis, S.; Stravrakis, G. N.; Beevor, P. S.; Hall, D. R.; Nesbitt, B. F. (Cent. Overseas Pest Res., London W8 5SJ, England) **Laboratory and field studies of the female sex pheromone of the olive moth, *Prays oleae.*** *Experientia* 35(9): 1146-1147; 1979 (9 references).

Analysis by GC-EAG indicated that abdominal tip extracts of female *Prays oleae* contain a tetradecenal. Synethic (Z)-7- tetradecenal elicits a strong EAG response from male *P. oleae* and field tests show it to be comparable in attractancy with the virgin female moth. (Z)-9-Tetradecenal also produces a strong EAG response but it is not an attractant and, when added to (Z)-7- tetradecenal, markedly reduces trap catches. (Author abstract by permision)

80-0012. Signorile, G. (Ist. Ig., Univ. Bari, Bari, Italy) **Ricerche sul contenuto in mercurio dell'ittiofauna stanziale delle acque costiere della citta' di Bari. [Study on mercury content of fishes living in the sea near Bari (Italy).]** *Ig. Mod.* 72(7): 773-779; 1979 (Italian).

Eighty-two specimens of 30 marine species obtained from the sea near Bari (southern Italy) were analyzed for mercury content. Of the samples, 54% exceeded the Italian maximum allowable concentration of 0.7 ppm Hg. Fifteen percent of the samples contained 0.5 to 0.7 ppm Hg. Large fish (*Lophius piscatorius, Raja asterias, Mustelus mustelus*, and *Squalus acanthias*), have been found to contain high mercury levels. However, some small fish also contained levels close to or above 0.7 ppm.

80-0013. Oster, P.; Rieben, F. W.; Waldherr, R.; Schettler, G. (Univ. Heidelberg, Heidelberg, BRD) **Blood clotting and cholesterol crystal embolization.** *J. Am. Med. Assoc.* 242(9): 2070-2071; 1979 (5 references).

In a letter-to-the-editor a case of cholesterol crystal embolization (CCE) in a 65-yr-old man being treated with sodium warfarin for bilateral femoral vein thrombosis is described. Three mo after initiating sodium warfarin therapy, livedo reticularis, muscle pain, necroses, and ulcerations of the lower extremities were noted. At autopsy, severe ulcerative atheromatosis of the aorta and CCE in both kidneys, liver, spleen, prostate and femoral arteries were seen. A mechanism for CCE development from the warfarin therapy is suggested.

80-0014. Bowman, B. T.; Sans, W. W. (Res. Inst., Agric. Canada, London, Ontario N6A 5B7, Canada) **The aqueous solubility of twenty-seven insecticides and related compounds.** *J. Environ. Sci. Health B* 14(6): 62-634; 1979 (19 references).

Aquatic solubilities were determined for 27 insecticides and related cmpounds, including bromophos, carbofuran, chloropyrifos, diazinon, disulfoton, disulfoton sulfoxide, disulfoton sulfone, ethion, fenitrothion, fensulfothion, fensulfothion sulfone, fonofos, fonofos oxon, iodofenphos, leptophos, leptophos oxon, paraoxon, parathion, amino parathion, methyl parathion, phorate, phorate sulfoxide, phorate sulfone, ronnel, terbufos, terbufos sulfoxide, and terbufos sulfone. These solubilities are a basic property of pesticides that is useful in predicting their partitioning tendencies between solid and liquid phases found in the natural environment. The findings are compared to those reported values in the current literature.

80-0015. Andreeva, E. I. (All-Union Res. Inst. Chem. Means Plant Prot., Moscow, USSR) **Geksatiuram - protravitel' samian. [Hexathiuram seed dressing.]** *Khim. Selsk. Khoz.* 17(6): 30-31; 1979 (Russian).

Various toxicological aspects of the fungicide Hexathiuram are reviewed. Hexathiuram has no negative effect on the environment; even prolonged use of the fungicide does not result in its accumulation in the soil. Hexathiuram is not toxic for major groups of soil microorganisms, earthworms, bees and other beneficial insects. The yield obtained from the seeds treated with fungicide did not contain Hexathiuram residues. The treated seeds can not be used as a forage and should be kept separately from the food products. Hexathiuram is toxic for humans after inhalation of dust; toxicity of the fungicide is determined by the properties of its components tetramethyl thiuram sulfide (thiram) (700-800 mg/kg) and hexachloro benzene (700-800 mg/kg).

80-0016. Gilston, A. (Dep. Anesth., Natl. Heart Hosp., London W1M 8BA, England) **Operator risk in mouth-to-mouth resuscitation.** *Lancet* 2(8144): 694; 1979 (3 references).

A short letter-to-the-editor is presented in which an argument is made for starting external heart massage before mouth to mouth resuscitation. The possibility of transferring cutaneous tuberculosis and insecticide poisoning are given as examples of operator risk.

80-0017. Lee, C. (Author address not given) **Dioxin (dilemma)?** *Med. J. Aust.* 1(13): 602-603; 1979 (7 references).

A review is presented in which the 2,3,7,8-tetrachloro dibenzo- *p*-dioxin (TCDD) in the environment is discussed. TCDD exists as a contaminant in compounds used as herbicides, germicides and in the treatment of hides. TCDD is lethal at the μg/kg level. Several cases of human and animal exposure are discussed. Human disorders have been attributed to pesticides in which TCDD is a contaminant. No safe dose of TCDD has been determined. The author calls for strict control of the use of TCDD contaminanted chemicals and the eventual elimination of TCDD from our environment.

80-0018. Lindley, M. (Author address not given) **Twenty years of pheromomones.** *Nature (London)* 281(5728): 181-182; 1979.

Programs under study in various parts of the world using pheromones in efforts to achieve pest control were reviewed at a conference in Sweden dealing with the chemistry of insects. In general, the studies have been disappointing with regard to patents and strict standards of environmental agencies. There was hope, however, that while pheromones alone would not take care of the pest problems their use in some ways might lower the dependence on pesticides. Some of the studies reported dealt not so much with trapping and killing pests as with confusing the insects so that the males and females could no longer detect each others presence.

80-0019. Anonymous **1978 Report of Committee E-35 on Pesticides.** *Proc. Am. Soc. Test. Mater.* 79: 442-443; 1979.

A report from the American Society for Testing and Materials Committee E-35 on Pesticides is given. Approved recommendations on standards and the activities of the various subcommittees are summarized. Some of the areas being worked on include new standards development in vertebrate pest control and laboratory animal test methods for use in human safety evaluation.

80-0020. Schvartsman, S. (Sch. Med., Univ. Sao Paulo, Sao Paulo, Brazil) **Toxicology: points of view of a tropical**

country. *Proc. Int. Congr. Toxicol.* 1: 67-74; 1978 (15 references).

In countries where malnutrition exists, there is a relation between the toxic effects of pesticides and the health, hygiene, and socio-economic conditions of the population. Presently great attention is being focused on the establishment of standards for the universal use of pesticides. Protein deficiency, for example, significantly changes the toxic effects of various types of pesticides. This has been demonstrated by studies conducted on animals receiving different types of diets.

80-0021. Golberg, L. (Chem. Ind. Inst. Toxicol., Research Triangle Park, NC) **Introductory remarks. Consideration of experimental thresholds.** *Proc. Int. Congr. Toxicol.* 1: 87-95; 1978 (12 references).

The problems associated with extrapolating test results from laboratory animals to humans are discussed. High dose studies, if interpreted correctly, can identify the metabolite load of a toxic chemical and possibly lead to the identification of the target organ. Determination of the irreversible, carcinogenic, mutagenic and teratogenic effects of chemical are reviewed. 2,4,5-T is cited as an example of a compound labeled as an irreversibly toxic agent. The author cautions against using statistical data alone in determining the toxicity of a compound and suggests that the evaluation of risk should be made with other factors in mind.

80-0022. Gehring, P. J.; Young, J. D. (Toxicol. Res. Lab., Health & Environ. Res. Dow Chem., Co., Midland, MI) **Application of pharmacokinetic principles in practice.** *Proc. Int. Congr. Toxicol.* 1: 119-141; 1978 (27 references).

The concentration of a toxic agent at the target site and the duration of exposure to the chemical are factors which determine the toxicity of a given chemical. Studies must be made of the absorption, distribution, biotransformation and ultimate excretion of the chemical before conclusions as to its toxicity can be reached. By gathering data on low dose and high dose exposures using intraspecies and interspecies experimentation definitative extrapolations of potential toxicity can be made. Data collected on several chemicals is presented, including experiments with 2,4,5-T, 1,4-dioxane, 2,3,7,8- tetrachloro dibenzo-*p*- dioxin, decarbromo diphenyl oxide and octabromo biphenyl, and 2,2-dibromo- 3-nitrilo propionamide.

80-0023. Truhaut, R. (Cent. Rech. Toxicol., Fac. Sci. Pharm. & Biol., Univ. Rene Descartes, Paris, France) **Some remarks on general principles for prevention of toxic hazards.** *Proc. Int. Congr. Toxicol.* 1: 369-380; 1978 (13 references).

The author discussed toxicology as a preventive science with emphasis on the role of the toxicologist in protecting the health of the people. Recognition of toxic hazards is necessary in order to prevent them. The toxicological evaluation required to recognize hazards involves collection of facts, interpretation of the facts, and making decisions based on the interpretations. The effects of toxic hazards on organisms other than man and the environment are also considered. General preventive measures are discussed. Limitation of exposure, analytical controls, and the importance of health education are also covered.

80-0024. Cole, H. A. (Forde House, Hardington Mandeville, Yeovil BA22 9NW, England) **Pollution of the sea and its effects.** *Proc. R. Soc. Lond. Ser. B* 205(1158): 17-30; 1979 (40 references).

In this review, the effects of marine pollution on living resources and marine life, and on human health, are discussed. With a few exceptions, it is felt that major stocks of marine animals do not show evidence of being reduced by pollution, with other environmental factors being more significant than pollution. Problems associated with oil and sewage pollution of the sea are discussed. Some data on the concentrations of heavy metals, DDT, and PCBs in fish and shellfish are presented. It is stated that, with three exceptions, organochlorine pesticide residue levels and PCBs have caused no more than local damage. The exceptions are: eggshell thinning, attributed to accumulation of DDE; periodic unexplained mortalities of seabirds, which have been found to contain elevated levels of PCBs; and seal losses and reproductive failure associated with enhanced levels of DDT and PCBs.

80-0025. Graham-Bryce, I. J. (Rothamsted Exp. Stn., Harpenden, England) **Insecticides and fungicides department.** *Rothamsted Report for 1978* 1: 125-155; 1978 (38 references).

This review discusses recent events in the development and use of fungicides and insecticides. In the area given to insecticides various topics discussed include the relationship between molecular structure and insecticide activity of pyrethroids, the mode of action of insecticides on insect nervous systems, the nature of resistance, the side effects of insecticides on non-target organisms and beneficial insects, and the control of soil-borne pests. The section dealing with chemicals which influence invertebrate behavior discusses aphid alarm phermones, honey bee Nasonov pheromone, pheromones of *Anagasta kuehniella* (Zeller), and sex attractant lures for the pea moth. Under fungicides the topics covered include soil borne diseases, and foliar disease of cereals. On ways to improve the efficiency of pesticide use consideration is given to the behaviour of pesticides in soil, factors which influence adhesion of powders on seeds, use of foliar sprays, and bird repellents. Various equipment discussed includes a

modified synthetic fixative for silver staining, equipment used in mass pollination of cocounts, electrostatically charged spray application systems, insect activity, seed treatment apparatus, insect rearing, and a technique for rearing cereal aphids.

80-0026. Anonymous **Science award for insecticide development.** *S. Afr. J. Sci.* 75(7): 289; 1979.

The Unesco Science Prize has been awarded to a group of British scientists for their work on pyrethroids. The Rothamsted Exp. Station chemists synthesized the first two successful compounds, resmethrin and bioresmethrin, in 1965. Pyrethrins are active against a wide range of insect species, are not harmful to mammals under normal use, and do not pollute the environment.

80-0027. Young, A. L.; Calcagni, J. A.; Thalken, C. E.; Tremblay, J. W. (Occup. & Environ. Health Lab., USAF, Brooks AFB, TX 78235) **The toxicology, environmental fate and human risk of Herbicide Orange and its associated dioxin.** *US NTIS AD Rep.* AD-A062, 143: 247p.; 1978 (432 references).

The use of herbicides in South Vietnam between 1962 and 1971 was reviewed, including the nature and quantities of herbicides used, their handling and application. Emphasis was placed on Herbicide Orange, a 50:50 mixture of 2,4-dichloro phenoxyacetic acid (2,4-D) and 2,4,5-trichloro phenoxyacetic acid (2,4,5-T), with its associated contaminant 2,3,7,8- tetrachloro dibenzo-*p*-dioxin (TCDD). The at-risk US military population in South Vietnam was defined to establish the potential for exposure in handling and application of Herbicide Orange. The environmental fate of the phenoxy herbicides and TCDD was reviewed to evaluate the potential for human risk assocated with exposure to areas previously treated with Herbicide Orange. The occupational and environmental aspects of the project to incincerate at a sea 2.22 million gallons of Herbicide Orange during the summer of 1977 were summarized to assess the potential for human exposure in handling large quantities of the material. Scientific data were reviewed on incidents and episodes involving suspected poisoning of humans or animals by phenoxy herbicides or TCDD. Literature dealing with animal toxicology and the effects of human exposure to 2,4-D, 2,4,5-T and TCDD was reviewed to correlate exposures with symtomatology.

80-0028. Fusi, P.; Franci, M.; Ristori, G. G. (Ist. Chim. Agrar. For., Univ. Firenze, Florence, Italy) **Indagini preliminari sull'adsorbimento dell'erbicida Asulam de parte di goethite, gibbsite e montmorillonite. [Preliminary studies on adsorption of the herbicide asulam by goethite, gibbsite, and montmorillonite.]** *Agrochimica* 22(3-4): 390-397; 1978 (20 references) (Italian).

The adsorption of asulam [methyl (4-aminobenzene sulfonyl) carbamate] (concentration 0-50 μg/ml) on suspended goethite, gibbsite, and montmorillonite was studied as a function of the pH value (2.5-8.5). On gibbsite and goethite the adsorption reached its maximum at pH 5, which is close to the pK_a value of asulam (4.82). The adsorption on montmorillonite showed a steady increase with decreasing pH value. Adsorption was reversible on all three adsorbents.

80-0029. Galiulin, R. V.; Sokolov, M. S.; Sukhoparova, V. P.; Zolotareva, B. N. (Inst. Agrochem. & Soil Sci., Pushchino, Moscow, USSR) **Razlozhenie linurona, monolinurona i ikh proizvodnykh v razlichnikh vipakh pochv v zavisimosti ot temperaturnykh uslovii. [Degradation of linuron, monolinuron and their derivatives in various types of soil depending upon the temperature conditions.]** *Agrokhimiya* (6): 109-116; 1979 (28 references) (Russian).

An attempt was made to evaluate the rate of degradation of two widely used herbicides, linuron and monolinuron, as well as their derivates, 3,4- dichloraniline (3,4-DCA) and 4-chloraniline (4-CA), in various types of soils and under different temperature conditions. Experimets were conducted in various soil-climatic regions of the European part of the Soviet Union. The average daily temperature in a 10-20 cm soil layer ranged from 8°C to 25.2°C. Seven different soil types were used. Aqueous-acetone solutions of herbicides were applied to the soil (10 and 100 mg/kg). One kg samples of soil with herbicides were placed into plastic bags and exposed in a drilling layer for 38 days. The residues of herbicides and their metabolites were determined photometrically. It was found that regardless of the soil type, the compounds could be arranged in the following order (according to their rate of degradation): 4-CA/ 3,4-DCA/ monolinuron/ linuron. Of test compounds the persistance of 3,4-DCA showed maximal dependance upon temperature, and 4-CA showed minimal dependance. For all compounds the rate of degradation was directly dependent upon the temperature. The temperature interval of 23-25°C was found to be optimal for the degradation of compounds.

80-0030. Tazuev, M. T. (Azerbaidzhanian Inst. Plant Prot., Kirovobad, USSR) **Vliianie gerbitsidov na soderzhanie podvizhnykh form pitatel'nykh veschehestv v pochve. [Effect of herbicides on the level of mobile forms of nutrient substances in soil.]** *Agrokhimiya* (6): 117-118; 1979 (Russian).

The effect of the herbicides dilapone (10 kg/ha), simazine (10 kg/ha), eradicane (EPTC; 10 kg/ha) and glyphosphate (3-4 kg/ha) on the nutrient regimen of the soil on vineyard was studied. The level of nitrates, mobile phosphorous, and potassium in soil samples was determined before the blooming, during the period of grape growth, and after harvesting. It was found that application of herbicides resulted in significant increase of the mobile nutrient substances in the soil.

80-0031. Dawson, G. W.; Weimer, W. C.; Shupe, S. J. (Battelle Pac. Northwest Lab., Richland, Washington 99352) **Kepone - a case study of a persistent material.** *AIChE Symp. Ser.* 75(190): 366-374; 1979 (15 references).

At production sites for Kepone (chlordecone), the chemical found its way into the environment by various major routes. Atmosperic emisssions, discharges in the wastewater into the municipal sewage system, and the bulk discharge of contaminated sludge were each pathways for the escape of Kepone into the natural environment. The resulting types of contamination and spread from each of the routes of escape are discussed. Particular attention is given to Bailey Bay and the James River as they have become the final sink for Kepone since the start of the production of that chemical. The non-degradability of the substance indicates that it can be expected to persist for a long while. Natural forces will slowly disperse the chemical throughout sediments. It is concluded that this poses an insidious hazard as small amounts can contaminate large segments of the environment.

80-0032. Watabe, K.; Hayashi, S.; Sugaya, H. (Inst. Rural Med., Hiraga Gen. Hosp., Hiraga, Akita, Japan) **Residues of organochlorine pesticides and PCB in the human body.** *Akita-Ken Noson Igakkai Zasshi (Akita J. Rural Med.)* 26(1): 63-64; 1979 (Japanese).

Results of determination of organochlorine pesticide residues in human milk, adipose tissue, liver, kidney, and spleen in 1977 were reported. Average values of β-BHC, *p,p'*-DDT and dieldrin in milk were 0.045, 0.053 and 0.0006 ppm respectively. In adipose tissue β-BHC was 2.672; *p,p'*-DDE was 4.390; and dieldrin was 0.033 ppm on a fat basis. The amount of residues was highest in liver, followed by kidney then by spleen as compared to 1976's order of kidney, liver and spleen, presumably due to the procedure of determination. The amount of residue of PCB in adipose tissue and organs was nearly the same as that reported by the Ministry of Health and Welfare in 1973.

80-0033. Akman, M. S.; Ceylan, S.; Sanli, Y.; Sener, B.; Aksiray, Y. (Vet. Fak. Farmakol. Toksikol. Kurusu, Ankara Univ., Ankara, Turkey) **Turkiye'nin akdeniz**

ashillerinde avlanan, kiyilarimiza bagimliekonomik bazi balik turleri ve karideslerde organik klorlu insektisidlerden ileri gelen kontaminasyonun arastirilmasi. [Determination of the contamination level of organochlorine insecticides in the various fish species and in shrimps obtained from the Turkish coast of the Mediterranean Sea.] *Ankara Univ. Vet. Fak. Derg.* 25(1): 121-134; 1978 (15 references) (Turkish).

Two hundred thirty four fish samples, comprising several species of fish, and shrimp from the Mediterranean Sea were analyzed for pesticide residue content. DDT derivatives were present in all samples, while the incidence of BHC isomers, aldrin, dieldrin, and endrin residues were 99.1, 86.7, 74,7, and 65.3%, respectively. The mean total concentrations of organochlorine insecticides were 0.339 ppm based on wet tissue, and 21.65 ppm in fatty tissues.

80-0034. Grossklaus, D. (Inst. Vet. Med., Robert von Ostertag Inst., Berlin, BRD) **The occurrence and importance of residues in meat and their evaluation within official meat inspection.** *Ann. Ist. Super. Sanita* 14(2): 319-333; 1979 (5 references).

Chemicals which are often found as contaminants in meats include drugs used in veterinary therapy, additives used in animal nutrition, plant protection products and pesticides, and toxic substances in the environment. Of the pesticides which contaminate meat, those intentionally applied to reduce parasites during animal growth or meat processing are included. Tolerance limits for the amount of pesticides allowed in meat products have been suggested by the FAO/WHO Expert Group on Pesticide Residues. The acute and chronic toxicity of each pesticide is a major factor in establishing its residue limits in meat products. Organochlorine pesticides are discussed as substances which often bioaccumulate in the adipose tissues of many livestock animals. Heavy metals and PCB are common toxic substances that are foud in high amounts in animal meats. Meat of ruminants frequently contains radioactive elements through livestock consumption of feed contaminated by radioactive fall-out. Evaluation of substances involving health risks under the Meat Inspection Act is described. Carcasses which do not pass the criteria of residue inspection are condemned for human consumption.

80-0035. Odam, E. M.; Pepper, H. W.; Townsend, M. G. (Pest Infestation Control Lab., Minist. Agric., Fish. & Food, Tolworth, Surbiton, Surrey KT6 7NF, England) **A study of the persistence of warfarin on wheat bait used for the control of grey squirrels (*Sciurus carolinensis*).** *Ann. Appl. Biol.* 91(1): 81-89; 1979 (10 references).

^{14}-Carbon labeled warfarin was used to treat wheat. The initial concentrations of warfarin decreased by half in samples buried in forests with three different types of soil over time periods ranging from 9 to 60 days. This decrease in concentration was correlated with soil conditions and rainfall. When wheat was kept in a hopper after treatment no loss of warfarin was noted over a 12 month period. Warfarin was lost, however, from a pile of wheat which was left exposed on the soil surface. Wheat which germinated from unsterilized grain showed no detectable evidence of warfarin in the shoots.

80-0036. Edwards, C. A.; Stafford, C. J. (Rothamsted Exp. St., Harpenden, Herts AL5 2JQ, England) **Interactions between herbicides and the soil fauna.** *Ann. Appl. Biol.* 91(1): 132-137; 1979 (21 references).

In 8 long-term experiments paraquat treatment of soil resulted in an increase in the number of anthropods present in that soil. In 4 long-term experiments with clorthiamid used in an apple orchard a dramatic effect on the earthworm populations was noted, but it was not concluded whether the decrease in earthworm population was due to direct toxicity of the chemical or to a lack of plant organic matter in the soil. Further experimentation indicated that the latter, indirect, reason was the cause of the loss of earthworms. Cyanazine treatments caused a depression in populations of Collembola. Simazine also caused a decrease in soil invertebrate populations, but in this case the decrease was a result of a direct toxic ation of the chemical.

80-0037. Hance, R. J. (Agric. Res. Counc. Weed Res. Organ., Begbroke Hill, Yarnton, Oxford OX5 1PF, England) **Herbicide persistence and breakdown in soil in the long term.** *Ann. Appl. Biol.* 91(1): 137-141; 1979 (16 references).

The persistence and breakdown of herbicides in the soil is discussed with reference being made to evaporation, leaching, uptake by plants, and various processes of degradation. Degradation involving both biological and non-biological action is discussed. Hydrolysis, oxidation, or reduction are offered as pathways of non-biological transformations. Microbiological activities are also included as representation of biological degradation.

80-0038. Ziegler, W.; Koeniger, M.; Wallnoeffer, P. R. (Landesant. Bodenkult. Pflanzebau, Munich, BRD) **Gehalt an Umweltchemikalien (Organochlor verbindungen) in Amseleieren aus charakteristischen Biotopen. [Proportions of environmental chemicals (organochlorine compounds) in the eggs of blackbirds (*Turus merula*) collected from characteristic biotopes.]** *Anz. Schaedlingskd. Pflanzenschutz. Umweltschutz* 51(10): 145-148; 1978 (11 references) (German).

Blackbird eggs collected during the spring of 1977 from three characteristic biotopes (alpine foot hills, city, and farmland) in Bavaria were analyzed for organochlorine pesticide residue contents. DDE and PCB residues were

present in considerably elevated concentrations, while other compounds appeared in small amounts in all eggs. PCB residue levels were the highest in the city (av. 1.7 ppm; max. 4 ppm), and decreased to an average of 0.4 ppm (max. 1 ppm) in the alpine biotope.

80-0039. Kornmayer, R.; Streit, B. (Limnol. Inst., D-7750 Konstanz-Egg, BRD) **Adsorption und Anreicherung von Atrazin und seinen Abbauprodukten an Flusswasser sediment. [Adsorption and accumulation of atrazine and its degradation products by stream sediment.]** *Arch. Hydrobiol., Suppl.* 55(2): 186-210; 1978 (30 references) (German).

The accumulation of ^{14}C- ring- labeled atrazine and its derivatives [2-chloro- 4-amino- 6- isopropylamino-s-triazine (2), 2-chloro -4- amino-6- ethylamino-s- triazine (3), 2-chloro-4,6- diamino-s- triazine (4), 2-hydroxy-4-ethylamino-6- sopropylamino-s- triazine (5), 2-hydroxy-4-amino-6- isoprpoylamino -s- triazine (6), 2-hydroxy- 4-amino -6- ethylamino-s-triazine (7), and 2-hydroxy- 4,6-diamino -s- triazine (8)] by stream sediment with different organic matter and lipid contents was studied by TLC at 3 different pH values in a 3 hour experiment simulating *in situ* conditions, using an initial mixture consisting of 84% atrazine and 16% derivatives (100 ppb). The overall accumulation increased significantly with increasing percentage of organic matter or lipid at pH 8 only; the increase was insignificant at pH 6 and 7. The accumulation in the inorganic fraction of the sediment increased with increasing lipophobic character and it increased significantly with decreasing pH (from 8 to 6). The accumulation by the organic fraction increased with increasing lipophilia of the derivatives, the lipid fraction of the sediment being the major fraction compared to the rest of the organic fraction. The absolute accumulation ranged from 8 (atrazine) to 2,420 (8), on dry weight basis.

80-0040. Pearce, P. A.; Brun, G. L.; Witteman, J. (Canadian Wildl. Serv., Dep. Environ., Fredericton, New Brunswick E3B 4ZD, Canada) **Off-target fallout of fenitrothion during 1978 forest spraying operations in New Brunswick.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 503-508; 1979 (12 references).

Studies were performed to determine the levels of fenitrothion that settled in non-target areas after forest spraying. Sampling stations were located around areas to be sprayed, and samples of fallout were collected routinely after spraying. Outside the forest spray zone fenitrothion was found in one-half the samples, ranging up to 1.1 μg/l. 85 km from the nearest application a concentration of 0.16 μg/l was observed. Seventy-seven μg/l rainwater was recovered in the spraying sites. The study demonstrated that pesticide fallout can occur in areas quite removed from spraying sites.

80-0041. Ahmad, N.; Walgenbach, D. D.; Sutter, G. R. (Entomol. Zool. Dep., South Dakota State Univ., Brookings, SD 57006) **Degradation rates of technical carbofuran and a granular formulation in four soils with known insecticide use history.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 572-574; 1979 (5 references).

Studies were performed on soil samples to determine the degradation rates of the pesticide carbofuran. Soil samples were taken from areas of previous use (by carbofuran), where it was both successful and unsuccessful, and from adjacent areas where it was not sprayed. Fifty g subsamples were treated with 40 ppm 10% granular carbofuran and 10 g samples were treated with 8 ppm technical grade carbofuran. More than 50% of the technical grade was lost in 7 days from all the plots except one of the previously unused ones. The granular formation dissipated at a much slower rate. Failure of the pesticide at one area was due to causes other than persistence.

80-0042. Riskallah, M. R.; Esaac, E. G.; El-Sayed, M. M . (Cent. Agric. Pestic. Lab., Inst. Plant Prot., Agric. Res. Cent., Dokki, Gizan, Egypt) **Photodegradation of leptophos.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 636-641; 1979 (19 references).

Studies were performed to determine the photodegradation rates and products of leptophos using UV light and direct sunlight. Thin residue layers in dishes and solutions in methanol were exposed to light, then at a given interval the contents of some dishes were examined on thin layer (TLC) plates. Results indicate that leptophos is rather stable. After 24 hours in UV light 47% of the original compound remained, 25% being in the form of a phenol, 9.2% in the oxon form, and 5.3% a combination of two unknown compounds. Degradation by sunlight resulted in, at most, 45% leptophos after 65 days. Also after that period, a little over 10% was seen as the phenol and oxon and about 5% was seen as an unknown compound. Methanol solutions were more stable than dried residues. Since the degradation products have been reported elsewhere to be toxic, the authors contend that toxicity studies of leptophos should include the breakdown products.

80-0043. Lukowski, A. B. (Inst. Zool., Univ. Warsaw, Warsaw, Poland) **The content of organochlorine insecticides in the eggs and tissues of young individuals of the great crested grebe (*Podiceps cristatus* L.) and of the coot (*Fulica atra* L.) from the Masurian Lakes.** *Ekol. Pol.* 26(3): 467-478; 1978 (19 references).

Residues of *p,p'*-DDT, *p,p'*-DDE, *p,p'*-TDE, *p,p'*-DMDT and γ-HCH (lindane) were determined in tissues and eggs of great crested grebes (*Podiceps cristatus* L.) and coots (*Fulcia atra* L.) collected from the Masurian Lakes of Poland. No differences in egg shell thickness were noted when eggs of both species were compared with

museum eggs. The total average insecticide content of the eggs of grebes was 13.650 ppm while that of coot eggs was 1.499 ppm. A general increase in the insecticide content was found between the first and second eggs of the same clutch suggesting a self-purification of organochlorine residues from the bodies of laying birds as fatty tissues are utilized in successive egg formation. No decrease was found in organochlorine insecticide levels in whole bodies of 24-hr chicks relative to chicks immediately after hatching. The highest content of insecticide residues were found in the liver, and the lowest, in the brain. It is suggested that eggs of these birds be used as indicators of the content of chlorinated hydrocarbons in bird tissues.

80-0044. Frese, E.; Bromel, J.; Zettl, K. (Staatliches Veterinaruhtersuchungsamt, 3500 Kassel, BRD) **Untersuchungen uber die Ruckstandsbelastung einheimischer Wildarten durch einige chlorierte Kohlenwasserstoffe. [Studies on residues of chlorinated hydrocarbons in West German game animals.]** *Fleischwirtschaft* 58(10): 1691-1694; 1978 (42 references) (German).

Fatty tissues of 448 game animals shot or found dead in West Germany during the period from March 1977 to March 1978 were analyzed by gas chromatography for residues of hexachlorobenzene (HCB) (maximum allowable concentration 0.5 ppm), α- and β-BHC (MAC 0.3 ppm), lindane (MAC 2.0 ppm), heptachlor epoxide (MAC 0.2 ppm), aldrin and dieldrin (MAC 0.2 ppm), and DDT and its isomers (MAC 3.0 ppm). Residue levels exceeding the MAC values were found in 42/448 animals; a total of 66 excessively high residue levels were measured. The pesticides found in excessively high concentrations most frequently were aldrin and dieldrin, α- and β-BHC, and hexachlorobenzene. The MAC of one pesticides only was exceeded in 30/42 animals, the MAC values of two pesticides in 6, and those of 3 pesticides in 3. No sex-related differences were found. The findings indicate that the overall pesticide burden is lower in the game than in domestic animals. In general, the highest values were found in animals representing the last link of food chains.

80-0045. Amuh, I. K. A. (Ghana At. Energy Comm., Legon, Ghana) **Effect of cooking on ethylene dibromide residue content of fumigated maize.** *Ghana J. Agric. Sci.* 8(3): 239-241; 1978 (12 references).

A sample of white maize was fumigated with ^{14}C-ethylene dibromide at a rate of 0.05 ml/kg for 7 days. Following fumigation, the grain was aired for 24 hr before being ground to a fine flour. A paste was made of the fumigated maize flour by boiling 20 g of flour in 130 ml of water. Samples of boiled mash and raw flour were analyzed for total, free, and bound ethylene dibromide using various procedures of radiometric analysis. Total ethylene dibromide content of the raw maize flour was 1.24 ppm compared to 0.58 ppm in the boiled mash. Free ethylene dibromide content of the raw maize flour was 0.74 ppm compared to 0.07 ppm in the boiled mash. Bound ethylene dibromide content in both the raw maize flour and the boiled mash was 0.49 ppm. These findings suggest that the process of cooking is an effective method of reducing ethylene dibromide residues in raw maize flour for human consumption.

80-0046. Gallagher, J. L.; Robinson, S. E.; Pfeiffer, W. J.; Seliskar, D. M. (EPA Corvalis Environ. Res. Lab., Corvallis, Oregon 97330) **Distribution and movement of toxaphene in anaerobic saline marsh soils.** *Hydrobiologia* 63(1): 3-9; 1979 (8 references).

This study on the movement and distribution of toxaphene in saline marsh soils allowed 4 conclusions. The toxaphene accumulation in the soil was only at a significant level where the substrates were frequently subjected to tidal flooding by contaminated water. As the depth of the soil increased, the concentration of toxaphene contaminant decreased. Organisms living in different levels of the soil may be subjected to as varying a concentration of toxaphene as a fifty-fold range. Toxaphene distribution patterns in the marsh soils are functions of basipetal and acropetal plant translocation, as well as leaching, degradation and pesticide concentration at the time of deposition.

80-0047. Tu, C. M. (Res. Inst. Agric. Canada, London, Ontario N6A 5B7, Canada) **Influence of pesticides on acetylene reduction and growth of microorganisms in an organic soil.** *J. Environ. Sci. Health B* 14(6): 617-624; 1979 (28 references).

Samples of organic soil were treated with various chemicals including chlorfenviphos, chlorpyrifos, diazinon, ethion, ethoprop, fensulfothion, fonofos, leptophos, malathion, arathion, phorate, thionazin, triazophos, trichloronat, terbufos, chlordane, dieldrin, lindane, carbofuran, metalkamate, oxamyl, permethrin, DD, teleone (dichloropropene), teleone C (chloropierin), telone II (dichloropropene), vorlex, captan, maneb, thiram, 2,4-D, and nitrapyrin. Acetylene reduction was not inhibited by pesticide exposure. The population of non-symbiotic nitrogen fixers was not significantly inhibited. Fensulfothion, fonofos, oxamyl, DD, telon and telone C had a stimulatory effect on the population of nonsymbiotic nitrogen fixers. Temporary declines were noted in bacterial and fungal populations.

80-0048. Szeto, S. Y.; MacCarthy, H. R.; Oloffs, P. C.; Shepherd, R. F. (Dep. Biol. Sci., Simon Fraser Univ., Burnaby, British Columbia V5A 1S6, Canada) **The fate of acephate and carbaryl in water.** *J. Environ. Sci. Health B* 14(6): 635-654; 1979 (8 references).

Acephate proved resistant to hydrolysis between

pH 4.0 and 6.0, regardless of temperature changes. At pH 8.2 hydrolysis of acephate was strongly affected by temperature. While trace amounts of methamidophos were detected at pH levels between 4.0 and 6.0, quantitative amounts were found between pH 6.9 and 8.2. In pond water acephate was more persistent than in creek water. One major factor in this finding was microbial breakdown. In the presence of bottom sediments about 20% of the acephate moved to these sediments after 2 days in the pond and after 7 days in the creek.

80-0049. Miles, J. R. W.; Harris, C. R. (Res. Inst., Agric. Canada, London, Ontario N6A 5B7, Canada) **Carbofuran residues in organic soils in southwestern Ontario, 1977.** *J. Environ. Sci. Health B* 14(6): 655-661; 1979 (18 references).

Soil samples were taken from 22 farms in the Holland Marsh, a vegetable growing area with soil high in organic content 50 km north of Toronto, Canada. The samples were taken in early November. Carbofuran and 3-ketocarbofuran residues were detected in all samples taken. Of the 22 farms sampled 19 contained residues of carbofuran ranging from 0.04 ppm to 1.5 ppm total carbofuran. Of the total carbofuran residues found, 3-ketocarbofuran comprised 7-50%. The studies showed that carbofuran, in spite of its widespread use, does not appear to be accumulating in the organic soils in Ontario.

80-0050. Kimura, R.; Hayashi, T.; Sato, M.; Aimoto, T.; Murata, T. (Shizuoka Coll. Pharm., Oshika, Shizuoka, Japan) **Identification of sulfur- containing metabolites of *p*- dichlorobenzene and their disposition in rats.** *J. Pharmacobio-dyn.* 2(4): 237-244; 1979 (8 references).

Male wistar rats were fasted for more than 16 hours, and then given orally a corn solution of *p*-DCB (*p*-dichlorobenzene) at 200 or 800 mg/5.0ml/kg dose levels. Two metabolites appeared in the blood and remained there for many hours even after the *p*-DCB had practically disappeared from the blood. These metabolites were 2,5-dichlorophenyl methyl sulfoxide and 2,5- dichlorophenyl methyl sulfone. It is suggested that the storage of *p*-DCB in the fatty tissue and the slow excretion rates of these two metabolites may be responsible for the finding of these two metabolites present in the blood for such long periods.

80-0051. Klintsare, A. A. (Avgust Kirkhenshteyn Inst. Microbiol., Latvian SSR Acad. Sci., USSR) **Pestitsidy kak ekologicheskiy faktor pri formirovanii mikrobnykh soobschchestv na rasteniyakh i v pochve. [Pesticides as ecological factors in the formation of microbe associations on plants and in soil.]** *Latv. PSR Zinat. Akad. Vestis* (10): 131-136; 1978 (50 references) (Russian).

Studies on the effects of pesticides on soil and epiphytic microorganisms are reviewed. The effects of the pesticides are dependent on such factors as the chemical formulation, dose and length of use of the preparation, and the climatic, meteorological, and agrotechnical conditions. Hexachlorane (BHC) and DDT were found not to have strong toxic effects on the soil microflora. BHC stimulates the growth of *Azotobacter* and nitrifying bacteria, while benzene hexachloride (BHC) inhibits the soil microflora. Thiuram (thiram) inhibits the growth of fungi without inhibiting the growth of bacteria. Organomercurials [arasan (thiram), cereasn, spergon (chloronil), granosan (ethylmercuric chloride)] are toxic for *Thizobium meliloti, Rh. lupini, Rh. japonicum, Azotobacter chroococcium, Echerichia coli,* and *Phythium debaryanum.* Broad-spectrum herbicides, e.g., atrazine, simazine, and 2,4-D cause marked changes in the qualitative and quantitative composition of the individual groups of bacteria, actinomycetes, and molds. Seed dressing with granosan reduces the infestation of the seeds with microorganisms during storage.

80-0052. Zenon-Roland, L.; Gilles, G. (Cent. Rech. Phytopharm., Inst. Rech. Sci. Ind. Agric., Gembloux, Belgium) **Evolution des residus de triadimefon et de vinchlozoline sur fraises. [Triadimefon and vinclozolin residue evolution in strawberries.]** *Meded. Fac. Landbouwwet., Rijksuniv. Gent.* 43(2, Pt. 2): 1269-1283; 1978 (2 references) (French).

Triadimefon was applied in 1975 and vinclozolin in 1975 and 1976 to strawberries in Belgium for control of a fungal fruit rot. Triadimefon at an application rate of 1.25 g AI/are had a half-life of 14 days under normal growing conditions. Residues of triadimefon in strawberries were less than 1 ppm. The half-life of vinclozolin was found to be 22 days when applied after 2 successive yr at a rate of 7.5 g AI/are. Residues in fruits decreased from 5 to 1.5 ppm after the last treatment with vinclozolin until harvesting. It is suggested that the dry summer of 1976 in Belgium limited the elimnation and breakdown of vinclozolin by strawberry plants and strongly retarded the growth of fruits. In 1975, under normal weather conditions, a half-life of 12 days was recorded for vinclozolin when applied at a rate of 7.5 g AI/are.

80-0053. Edward, C. A. (Entomol. Dep., Rothamsted Exp. St., Harpenden, Herts, England) **Soil biology and land use.** *Nature (London)* 281(5730): 339-340; 1979.

Studies briefly reported herein indicate that relatively few pesticides are toxic to earthworms. Chlordane, phorate, parathion, carbofuran, D-D, methyl bromide, metham sodium, chloropicrin, and carbendazim-based fungicides are among those pesticides which do kill the earthworm. In general pesticides do not have a drastic overall effect on soil arthropod communities, but do upset the balance in soil ecosystems, sometimes causing spectacular upsurges in specimens not affected by the chemical.

80-0054. Love, J. L.; Winchester, R. V.; Keating, D. L. (Chem. Div., Dep. Sci. & Ind. Res., Christchurch, New Zealand) **Fumigant and contact insecticide residues on dried fruits, cereals, nuts, and spices imported into New Zealand.** *N.Z. J. Sci.* 22(1): 95-98; 1979 (9 references).

Samples of dried fruit, cereals, nuts and spices imported into New Zealand in 1977 and 1978 were analyzed for pesticide residues. Methyl bromide and ethylene dibromide were determined as total bromide by x-ray fluorescence spectroscopy with electron capture detection, and organophosphorous residues by flame photometric detection in the phosphorous mode. Approximately one-half of the nut and spice samples contained total bromide above the allowable limit of 50 mg/kg, and there were occasional high bromide levels in cereal. No organophosphorus or organochlorine pesticide residues were found. The only contact insecticides detected were lindane and maldison (malathion), with many nut samples above the permissible limit of 0.5 mg/kg for maldison.

80-0055. Kuyama, H.; Furukawa, T.; Ikari, H.; Tsuyuki, H.; Kitamoto, M.; Futatsugi, M. (Res. Lab., Tokyo Org. Chem. Ind. Ltd., Toshima, Kita-ku, Tokyo 114, Japan) **Disappearance of copper terephthalate with soil- microoorganisms. Part II. Studies on organic copper fungicides.** *Nippon Nogei Kagaku Kaishi (J. Agric. Chem. Soc. Jpn.)* 53(1): 41-43; 1979 (3 references) (Japanese).

A spectrophotometric technique was used to determine the disappearance rates of copper terephthalate by soil microorganisms and terephthalic acid in the presence of cupric ion. Within a two week period of culture a large amount of terephthalate disappeared when the soil microorganisms were incubated with 1000 ppm terephthalate. The culture medium contained 50 ppm cupric ion and mineral.

80-0056. Kasai, A.; Asanuma. S.; Sasaki, K.; Suzuki, A.; Kurosawa, K.; Abe, E. (Japan Rural Med. Inst., Usuda, Nagano, Japan) **[Studies of pesticide residues in the human body and meats.]** *Nippon Noson Igakkai Zasshi (J. Jpn. Assoc. Rural Med.)* 28(3): 480-481; 1979 (Japanese).

Organochlorine pesticide residues (total-BHC, total-DDT, dieldrin and PCB) were investigated in human adipose tissues of 28 men and 48 women. The results were: total-BHC, % detection of 100, highest value of 18.804 ppm, lowest value of 0.609 ppm, average of 4.340 ppm with s.d. of 3.232: total-DDT, % detection of 100, highest value of 36.130 ppm, lowest value of 0.651 ppm, average of 10.927 ppm with s.d. of 8.286: dieldrin, % detecton of 100, highest value of 0.269 ppm, lowest value of 0.026, average of 0.097 ppm with s.d. of 0.057. No correlation was found with sex. There was a significant correlaton between total-DDT and age. Comparison of the residue data of 9 years showed that in spite of the ban of these organochlorine pesticides, a considerable amount still remains in human adipose tissue. Total-BHC, total-DDT, and dieldrin in domestic beef, imported beef, pork and chicken meat were: (in the above-order), total-BHC; 93.2 ppb, 0, 8.4 ppb and 10.0 ppb: total-DDT; 22.4 ppb, 3.0 ppb, 46.6 ppb and 44.5 ppb: dieldrin; 6.6 ppb, 0, 4.7 ppb and 7.5 ppb. It was noticed that organochlorine pesticide residues were far larger in domestic beef than in imported beef. In addition, organophosphorus pesticide [fenitrothion and surecide (cyanophenfos)] residues on vegetables were investigated. Fenitrothion was 12.0 ppm 3 days after application, 3.0 ppm 7 days after application, and 1.4 ppm after 10 days. The value on surecide was 7.7, 4.0 and 3.0 ppm, respectively.

80-0057. Sasaki, S.; Watabe, K.; Mizukami, M.; Hayashi, S.; Sugaya, H. (Hiraga Gen. Hosp., Hiraga, Akita, Japan) **Organochlorine pesticide residues in the human body- report of 1978.** *Nippon Noson Igakkai Zasshi (J. Jpn. Assoc. Rural Med.)* 28(3): 482-483; 1979 (Japanese).

Organochlorine pesticide residues (β-BHC, p,p'-DDE, p,p'-DDT, total-DDT, and dieldrin) in mother's milk, liver, kidney and spleen obtained in the authors' hospital were determined from April 1978 to March 1979. In mother's milk, the average concentration was, in the above order: 0.035, 0.050, 0.010, 0.062 and 0.0003 ppm on a whole milk base. In adipose tissue, the average value was: 3.185, 4.262, 0.734, 5.027 and 0.032 ppm fat base. In the liver, the value was: 0.108, 0.176, 0.236 and 0.002 ppm wet base. In the kidney, the value was: 0.075, 0.071, 0.007, 0.079 and 0.0006. DDT in adipose tissue showed a little higher than in 1977.

80-0058. Singh, K.; Shivakant; Singh, A. P. (U.P. Inst. Agric. Sci., Kanpur 2, India) **Persistence of methyl and ethyl parathion in soil and plant.** *Pesticides* 12(4): 39-41; 1978 (5 references).

Residues of methyl parathion were below the tolerance level 6 days after the chemical was applied to urd and pea at the rate of 0.625 and 1.25 kg AI/ha. Residues of ethyl parathion were below tolerance level 6-7 days after application at the rate of 0.5 to urd, pea and brown sarson, and at 10-11 days after the application of 1.0 kg AI/ha to the same crops.

80-0059. Rajukkannu, K.; Saivaraj, K.; Vasudevan, P.; Balasubramanian, M. (Author address not given) **Insecticides residues in sweet potato tubers (*Ipomoea batatas*).** *Pesticides* 12(8): 21-22; 1978 (7 references).

In field experiments, crops of the sweet potato *Ipomoea batatas* were treated 5 times with fenthion, (0.75 kg AI/ha), phosalone (0.525 kg AI/ha), monocrotophos (0.300 kg AI/ha), endosulfan (0.79 kg AI/ha), quinalphos

(0.375 kg AI/ha), and 1 time with carbonfuran (1.0 kg AI/ha) in a random block design. Bioassay and chemical tests for insecticide residues were performed on tuber samples at the time of harvest. All pesticide residues in tuber samples were found to be well below the recommended tolerance limits. It is suggested that carbofuran and alidicarb application be restricted to a dose of 1.0 kg AI/ha, and that all the other insecticides may be safely used to control pests on potato crops without any residue hazards.

80-0060. Verma, S. (Div. Entomol., IARI, New Delhi 110012, India) **Effect of temperature on the dissipation of phorate in soil.** *Pesticdes* 13(7): 41-42; 1979 (11 references).

The persistence of phorate in soil was evaluated. Containers of soil treated with phorate granules were kept at constant temperatures (15, 30, and 45°C) in the laboratory. Phorate residues were estimated biologically (using *Drosophilia melanogaster* Meigen as the test insect) and chemically. The biological and chemical estimation methods were sensative and correlated well. After 24 hr of treatment there was a 69-73% reduction in residues at all 3 temperatures (7.8, 8.6, and 8.7 ppm to 2.1, 2.5, and 2.6 ppm respectively). Up to 33 days of treatment the differences in degradation of residues at different temperatures was not significant. However, observations at 63 and 103 days after treatment indicated significantly less reduction at the lowest temperature (103 days; 0.44, 0.26, and 0.26 ppm). Phorate residues fell below detectable levels in 128, 117, and 109 days at 15, 30, and 45°C respectively. It was concluded that the different temperatures of 15, 30, and 45°C or lower might cause increased long term persistence of phorate.

80-0061. Burkhard, N.; Guth, J. A. (Ciba-Geigy Ltd., Agric. Div., Basle, Switzerland) **Photolysis of organophosphorus insecticides on soil surfaces.** *Pestic. Sci.* 10(4): 313-319; 1979 (9 references).

Photolysis on soil surfaces of the organophosphorus insecticides diazinon, methidathion and profenofos was studied under artifical sunlight conditions. All three compounds were readily degraded under the conditions used. The rate of degradation decreased in the order diazinon, profenofos, methidathion, and was always greater in moist soil. The same order of stability was also observed from photolysis studies in aqueous solution. The major photolysis products identified were 2-isopropyl-6-methylpyrimidin- 4-ol from diazinon, 5-methoxy-3H-1,3,4- thiadiazol- 2-one from methidathion and 4-bromo-2-chlorophenol and 4-bromo-2- chlorophenyl ethyl hydrogen phosphate from profenofos. The same compounds were formed in hydrolysis studies and also upon photo decomposition in aqueous solutions of diazinon and methidathion. Profenofos, however, showed a different photolytic reaction in aqueous systems, forming *O*- (2-chlorophenyl) *O*- ethyl *S*-propyl phosphorothioate. Soil photolysis studies together with hydrolysis experiments could be a useful quick method for obtaining early informaton on the chemical breakdown products which are to be expected in the soil environment. (Author abstract by permission)

80-0062. Lukowski, A. B. (Dep. Zool. & Ecol., Zool. Inst., Warsaw Univ., Warsaw, Poland) **DDT and its metabolites in antarctic krill (*Euphausia superba* Dana) from South Atlantic.** *Pol. Arch. Hydrobiol.* 25(3): 663-668; 1978 (8 references).

Krill were collected from the South Atlantic in the regions of Drake Passage, Bransfield Strait, South Georgia, and South Sandwich Islands. Samples taken early in February and March of 1976 showed a mean total DDT concentration ranging from 0.0040 to 0.0645 ppm in these 4 areas. It is suggested that the range of findings were caused by the age structure of the populations at the various locations, and from a higher local contamination with the insecticide in the Drake Passage and Bransfield Strait regions.

80-0063. Cherhati, T.; Kecskes, M. (Res. Inst. Plant Prot., Budapest, Hungary) **Linuron residues in soils after more than one year of incubation.** *Proc. Hung. Annu. Meet. Biochem.* 18: 15-16; 1978 (2 references).

The decomposition of linuron in the presence of other pesticides in the soil was investigated. Thirty ppm lindane, diazinon, TMTD (thiram), or Hg fungicides; 15 ppm lindane + TMTD; or 5 ppm propachlor, simazine, or methopromethryne herbicides were added to soil containing 10 ppm linuron. The linuron content of samples was determined with ECD-GC from 1 to 96 weeks after incubation at 26-28°C. During the first 10 weeks about 5-10% of the linuron was converted to 3,4- dichloro- aniline/wk; between weeks 36 and 96 the rate of metabolism dropped sharply (0.1 %/wk). A significant inhibitory rate of linuron decomposition by other pesticides could not be shown after week 36.

80-0064. Cherhati, T.; Hanos, E. (Res. Inst. Plant Prot., Budapest, Hungary) **The effect of physicochemical parameters of soils on the decomposition of adsorbed linuron.** *Proc. Hung. Annu. Meet. Biochem.* 18: 17-18; 1978.

The chemical decomposition of linuron in 7 types of soils was measured. Soil samples containing 25 ppm adsorbed linuron were incubated for 14 weeks at 5 and 75°C. Linear regressions were calculated between the rate of decomposition and the physico- chemical parameters (pH, ion binding capacity, and conductivity) of the soils. The

pH value of the soil was found to have the greatest influence (r=0.6975) on the decomposition rate, while the other parameters had negligible influence.

80-0065. Astolfi, E.; Higa, J. (Fac. Med., Univ. Salvador, Buenos Aires, Argentina) **Residues of organochlorine pesticides found in the food of the general population of Argentina.** *Proc. Int. Congr. Toxicol.* 1: 458; 1978.

Members of the general population of Argentina and food items in their average diet were studied to determine their organochlorine pesticide residue content. Adults and children, exposed and non-exposed to the chemicals; workers; mothers and newborn babies; and leucemic and healthy children, were included in the sample studied. Chlorine residues in mothers' milk were found to be several times greater than normally permissible. The amounts of organochlorine pesticide residues present in Argentinians were below the FAO/WHO limits, with the exception of those fed on mothers' milk.

80-0066. Correll, D. L.; Pierce, J. W.; Wu, T. L. (Smithsonian Inst., Chesapeake Bay Cent. Environ. Stud., Edgewater, MD 21037) **Studies on the transport of atrazine and alachlor from minimum till corn fields into Chesapeake Bay tidal waters.** *Proc. Northeast. Weed Sci. Soc.* 32(Suppl.): 21-32; 1978 (8 references).

Corn was planted and treated with herbicides from May 6 to May 18 1976 on a watershed which drains into a sediment trap zone of the Rhode River (a tidal river). A subwatershed of this watershed was also studied by collecting runoff from the watershed which would finally enter the sediment trap zone of the Rhode River. Both watersheds delivered atrazine and alachlor to the estuarine receiving waters. Of the atrazine, 58% was discharged in solution, and 68% of the alachlor was so discharged. The concentration of herbicides on the suspended sediments delivered to the trap zone was extremely high, especially after rainstorms. These concentrations may have been responsible for massive plant kills during the summer of 1976.

80-0067. Pussemier, L. (Inst. Rech. Chim., Minist. Agric., B-1980 Tervuren, Belgium) **Interactions des pesticides aves la matiere organique du sol. [Interaction of pesticides with the organic matter of soil.]** *Rev. Agric. (Brussels)* 31(3): 405-411; 1978 (25 references) (French).

Studies on the interactions of pesticides and pesticide residues with the organic matter of the soil are reviewed. The pesticides can be bound to the organic matter by chemical adsorption, via hydrogen bonds, and by physical adsorption. Chemical adsorption can be based on the formation of covalent bonds, ion exchange (especially in the case of cationic herbicides, while the molecules of basic herbicides must undergo protonation in the solution or on the colloid surface for this type of adsorption to take place), or on free electron pairs. Adsorption via hydrogen bridge constitutes a transition between chemical and physical adsorption. It is most common in the case of urea derivatives, symm.-triazines, and carbamates.

80-0068. Frank, R.; Thomas, R. L.; Holdrinet, M.; Kemp, A. L. W.; Braun, H. E.; Dawson, R. (Provincial Pestic. Residue Testing Lab., Ontario Minist. Agric. & Food, Univ. Guelph, Guelph, Ontario, Canada) **Organochlorine insecticides and PCB in the sediments of Lake Huron (1969) and Georgian Bay and North Channel (1973).** *Sci. Total Environ.* 13(2): 101-117; 1979 (24 references).

Surficial and core sediments obtained from Georgian Bay and North Channel in 1973 and from Lake Huron in 1969 were analyzed for organochlorine insecticides and PCB. Sediments from depositional zones of Georgian Bay and Lake Huron showed higher levels of organochlorine insecticides and PCB than those from non-depositonal zones. Mean levels of PCB and total DDT were 13 and 10 ng/g, respectively, in Lake Huron and 11 and 5 ng/g, respectively, in Georgian Bay. The mean sediment residue level of total DDT in Lake Huron was 7.8 ng/g. Only 5.7% of the sediment samples from main Lake Huron contained HEOD (dieldrin), while HEOD was found in 30% of the samples from Georgian Bay, and in 15% of the samples from the North Channel. Heptachlor epoxide was detected in sediment samples from all three water bodies. Endosulfan was present in 4% of the sediments sampled from the North Channel and Georgian Bay.

80-0069. Tsvetskova, T.; Delchev, K. (Cent. Vet. Res. Inst., Sofia, Bulgaria) **Residual amounts of chloroorganic pesticides in eggs of chickens from various poultry farms.** *Vet.-Med. Nauki* 15(2): 21-25; 1978 (Bulgarian).

Eggs from 18 large poultry farms were analyzed for organochlorine pesticide residue contents. Seventy to 75% of the samples were free of *p,p'*-DDE, *p,p'*-DDT, and dieldrin, while 57-65% of the eggs were conhaminated with α- and γ-hexachloran (α-BHC and lindane) (av. 0.016 ppm), heptachlor (0.006 ppm), orheptachlor epoxide (av. 0.01 ppm), residues. Eighty eight percent of the eggs contained up to 0.061 ppm *p,p'*- TDE. These values are far below the accepted tolerance levels.

80-0070. Blevins, R. D. (Dep. Health Sci., East Tennessee State Univ., Johnson City, TN 37601) **Organochlorine pesticides in gamebirds of eastern Tennessee.** *Water, Air, Soil Pollut.* 11(1): 71-75; 1979 (12 references).

Adult grouse, quail, and woodcocks from the eastern Tennessee area were analyzed for residues of lindane, heptachlor, endrin, aldrin, dieldrin, DDT, and methoxychlor. The results of the analyses demonstrated that aldrin concentrations were apparently not great enough to affect egg production and viability in the fowls collectecd. Endrin concentrations in all birds tested, however, were at least 1 ppm in the muscle tissue, a sufficient level to affect egg production, fertility and hatchability of these birds. Dieldrin concentrations were 3 to 14 times greater than the concentration known to affect egg production, hatchability and viability. High mortalities of game birds are expected, based on these findings, in all three counties of upper eastern Tennessee, especially in Washington County.

80-0071. Kirkland, K. J.; Keys, H. (Exp. Farm., Agric. Canada, Scott, Saskatchewan SOK 4AO, Canada) **The long-term effect of picloram and its residue on grain production and weed control.** *Weed Sci.* 27(5): 493-497; 1979 (10 references).

The persistence of picloram (4-amino- 3,5,6-trichloro picolinic acid) was measured each spring over an 8-yr period following repeated annual applications at rates ranging from 0.020 to 0.070 kg/ha. Picloram residue levels were proportional to rate of application but averaged approximately 45% of the original levels when measured 12 months following application and declined to 10% 24 months after application ceased. Control of wild buckwheat (*Polygonum convolvulus* L.) was good with major population declines over the test period. Crop tolerance and yields were not affected at rates of 0.035 kg/ha or less. (Author abstract by permission)

80-0072. Kapusta, G. (Plant & Soil Sci. Dep., Southern Illinois Univ., Carbondale, IL 62901) **Seedbed tillage and herbicide influence on soybean (*Glycine max*) weed control and yield.** *Weed Sci.* 27(5): 520-526; 1979 (10 references).

Twenty herbicide treatments were evaluated on conventional-till (plow, disc, and harrow), minimum-till (disc only), and no-till planted soybeans [*Glycine max* (L). Merr.] from 1976 through 1978 at the Belleville Research Center in St. Clair County, Illinois. The soil type was a Weir silt loam (Typic Ochraqualf) characterized by poor internal drainage and 1.2% organic matter. Weed population by species, weed control, and soybean population, injury, and yield were obtained. Fall panicum (*Panicum dichlotomiforum* Michx.) and giant foxtail (*Setaria faberi* Herrm.) were the dominant species in all tillage systems, exceeding 1 million plants/ha in the conventional and no-till plots. These species and ivyleaf morningglory [*Ipomoea hederacea* (L.) Jacq.] were the most difficult to control each year. Weed control was the poorest in the no-till plots because of the large size of the weeds at the time of herbicide application, insufficient rainfall following, and because the plots were not cultivated. The soybean population was equal in all tillage systems except in 1976 when the no-till population exceeded that in the other tillage systems. Treatments that included oryzalin (3,5-dinitro- N^4,N^4-dipropyl sulfanilamide) caused 42 and 35% soybean injury in the 1976 minimum and no-till plots, respectively. Postemergence- applied naptalam (*N*-1- naphthyl phthalamic acid) plus dinoseb (2-sec-butyl -4,6-dinitrophenol) caused leaf burn each year that ranged from 5 to 35% but all plants recovered within several weeks of application. The seedbed tillage method and herbicide treatments did not significantly affect soybean yields in 1976 when all the herbicides were effective. No-till yields in 1977 and 1978 were substantially lower than yields in conventional and minimum-till plots because of poor weed control. Soybean yields were 2506, 2466, and 1714 kg/ha in the conventional-till, minimum-till, and no-till plots, respectively, when averaged over the 3 yr and 20 herbicide treatments. (Author abstract by permission)

80-0073. Bovey, R. W.; Ketchersid, M. L.; Merkle, M. G. (Sci. & Educ. Adm., ARS, USDA, College Station, TX 77843) **Distribution of triclopyr and picloram in huisache (*Acacia farnesiana*).** *Weed Sci.* 27(5): 527-531; 1979 (17 references).

The triethylamine salt of triclopyr [(3,5-trichloro - 2- pyridinyl) oxy] acetic acid and the potassium salt of picloram (4-amino- 3,5,6- trichloropicolinic acid) were applied as soil, foliar, and soil plus foliar treatments to greenhouse- grown huisache [*Acacia farmesiana* (L.) wildl.] At 1.12 kg/ha, picloram was more effective (97 to 100% defoliation) than triclopyr (51 to 83%) in defoliating huisache. Triclopyr was more effective at 2.24 kg/ha than at 1.12 kg/ha in defoliating huisache, except when applied to the soil. Soil or soil-plus-foliar treatments of triclopyr at 2.24 kg/ha were not significantly different from those of picloram at 1.12 kg/ha 15 weeks after treatment. Trichlopyr and picloram content was determined in and on leaves, stems, and roots at 0, 3, 10, and 30 days after treatment. More picloram than triclopyr was found in the leaves 30 days after treatmet with foliar sprays at equal rates. Soil, foliar, and soil-plus-foliar treatments resulted in greater accumulation of picloram than triclopyr in stem tissue. Herbicide concentrations in roots were usually low. Reasons for the greater herbicidal activity of picloram than of triclopyr in huisache are not clear; however, the greater accumulation of picloram than of triclopyr in leaf and stem tissue may partially explain the difference in herbicide activity. (Author abstract by permission)

See also 80-0008, 80-0014, 80-0015, 80-0027, 80-0090, 80-0094, 80-0097, 80-0110, 80-0127, 80-0128, 80-0172, 80-0231, 80-0253, 80-0257, 80-0258, 80-0269, *and* 80-0270.

80-0074. Young, R. J.; Jung, F. P.; Ayer, H. E. (OSHA, Cincinnati, OH) **Phorate intoxication at an insecticide formulating plant.** *Am. Ind. Hyg. Assoc. J.* 40(11): 1013-1016; 1979 (14 references).

Two case histories of phorate intoxication due to occupational exposure are desccribed. In the first case, a 34-yr-old male was admitted to the hospital in an unconscious state. He was treated with 2-PAM and atropine. Confusion, dizziness, nausea, vomiting and constricted pupils were also noted during treatment. In the second case, an 18-yr-old male was admitted to the hospital with severe respiratory distress, and was also treated with 2-PAM and atropine. Accompanying symptoms included cardiac arrhythmia, excessive salivation, respiratory distress, muscle fasciculations, and pinpoint pupils. In both cases, the indivuduals had worn protective clothing, goggles, and respirators while working in the dust house where technical grade Thimet (phorate) was produced. Gas chromatographic analyses of air samples from this work area showed phorate levels ranging from 0.07 to 14.60 mg/m^3. An 8-hr time-weighted average limit of 0.05 mg/m^3 was adopted for phorate by the Tennessee Department of Health. It is suggested that periodic monitoring of workplace atmospheres and regular testing of industrial ventilation systems also be carried out.

80-0075. Pramanik, A. K.; Hansen, R. C. (Dep. Pediatr., Neonatal Biol. Sect., Univ. Arizona Health Sci. Cent., Tucson, AZ) **Transcutaneous gamma benzene hexachloride absorption and toxicity in infants and children.** *Arch. Dermatol.* 115(10): 1224-1225; 1979 (12 references).

Two pediatric cases of absorption of and toxicity due to γ-BHC (lindane) are described. A premature 4-mo-old male infant was treated for scabies with 1% γ-BHC lotion. Abnormal neurological responses were observed when the infant was tested 2 days later by the Brazelton Behavior Test. The level of γ-BHC in the blood was 0.10 μg/ml in infants and children. In the second case a 2-yr-old boy was treated for a pruritic rash with 80 ml of 1% γ-BHC lotion over a 2 wk period. Eczematous, confluent plaques of dermatitis over the buttocks and scattered excoriated papules over the elbows, wrists, hands and legs were noted. Blood levels of γ-BHC 16 hr after the last application were 0.012 μg/ml. Factors which may play a role in the absorption of γ-BHC such as age, body area exposed, body fat supplies, inflammation or excoriations of the skin, and diet are discussed.

80-0076. Thieulin, G. (Comm. Nutr. Aliment., Acad. Nat. Med., Paris, France) **Projet d'Arrere fixant les teneurs maximales de pesticides organochlores dans le lait et les produits laitiers. [Draft of a decree regulating the maximum organochlorine pesticide level in milk and milk products.]** *Bull. Acad. Natl. Med. Paris* 163(5): 488-489; 1979 (French).

The maximum allowable organochlorine pesticide residue levels in milk and milk products were set at 0.02-0.2 ppm in France in 1971. An examination of the evolution of the residue levels during the 1971-1976 period shows a progressive reduction of the residue levels as a result of appropriate preventive measures, but also the emergence of a new source of contamination, such as toxic industrial substances, like PCBs. A further reduction of the maximum allowable organochlorine pesticide residue levels in milk and milk products was proposed recently.

80-0077. Mittal, O. P. (Ciba-Geigy India Ltd., Bombay, India) **Safety in organophosphorous pesticides industry.** *Chem. Age India* 30(9): 869-872; 1979.

The exceptionally high biological activities (particularly anticholinesterase) of organophosphorous pesticides pose potential risks to humans and domestic animals. Compounds whose LD50's to laboratory animals range between 50-200 mg/kg body wt are particularly dangerous if improperly handled. Proper ventilation for the control of airborne contaminants during manufacturing, adequately labeled and structurally sound containers, proper transportation to reduce chances of leakage and fire hazard, correct disposal of empty containers, and protective equipment for handlers of these compounds are among the prventive measures recommended.

80-0078. Majumder, A. K.; Venkatanarayanan, A. V. (Reg. Labor Inst., Adyar, Madras- 600020, India) **A prescription for safety and health of pesticide workers.** *Chem. Age India* 30(9): 873-875; 1979.

Guidelines discussed for providing safe working conditions in the manufacture of pesticides are grouped into two categories: emphasis on the responsibilities of employers is supplemented by suggestions to the workers handling potentially toxic substances. Concentrations of pesticides in the breathing zone of workers should be assessed annually, and should be kept well below recommended TLVs. The exposure of workers to starting ingredients, solvents, or final products should be minimized through engineering controls. Employers should follow strict safety guidelines in labeling, storage, clean-up, and disposal of the products, while employees should adhere to prudent sanitation and hygenic practices.

80-0079. Jung, H. D. (Kreiskrankenhaus Kreispoliklin. Templin, DDR-209 Templin, DDR) **Arbeitsdermatosen durch Pestizide. [Occupational dermatoses due to pesticides.]** *Dtsch. Gesundheitswes.* 34(24): 1144-1148; 1979 (46 references) (German).

Occupational dermatoses due to pesticides are discussed. Metham-sodium may cause contact eczema, with the breakdown product methyl isothiocyanate acting

as the actual allergen. Allergic-toxic contact enzyme and group-allergic reactions may be produced by allyl- isothiocyanate forming pesticides such as zineb, dazomet, ziram, and ferbam. 2,4-D and 2,4,5-T cause allergic-toxic reactions. Organic phosphates, such as methyl parathion or dimethoate, and DNOC rarely lead to contact enzyma, but may cause general intoxication. Choralhydrate and sodiumchlorate were found to cause toxic contact eczema. Cases of contact eczema were also reported due to propachlor, captan, and Trazalex.

80-0080. Nicholson, J. M. (Off. Public Awareness, US EPA, Washington, DC) **Toxic substances, science, and public responsibility: a comment.** *Environ. Int.* 2(2): 55-56; 1979.

In a brief overview, the role of environmental science education in increasing public awareness on the ecological dangers of toxic substances is examined. The damage that has already occurred in nature due to DDT, PCB, PBB, Kepone (chlordecone), asbestos, mercury, vinyl chloride and other man-made agents is well known. Several laws have been enacted by the US EPA in efforts to prevent pollution of the environment by toxic substances. It is suggested that producers, consumers, and government collaborate by demanding that products be safe and less damaging to the environment. Special dangers exist in the production of potentially toxic substances and the safety of workers must be guarded. The necessity for sharing information on the problems of toxic substances is stressed.

80-0081. Kolomodin, B.; Erne, K. (Dep. Occup. Med., Karolinska Hosp., State Inst. Vet. Med., Stockholm, Sweden) **Estimation of occupational exposure to phenoxy acids (2,4-D and 2,4,5-T).** *Eur. Soc. Toxicol., Congr.* 21: 45; 1979.

A study was performed to determine occupational exposure levels of phenoxy acids (2,4-D and 2,4,5-T). Concentrations in the individual breathing zone of applicators was 0.1 to 0.2 mg/m³. Plasma and urine levels during and after exposure were determined. Urine contained the highest phenoxy acid levels, with a mean of 8 (2,4-D) and 4.5 (2,4,5-T) μg/ml. The elimination of phenoxy acids in urine was rapid. Inhalation and dermal absorption seemed to be the means of uptake of phenoxy acids. No symptoms of intoxication were noted. The authors conclude that improved hygenic conditions will reduce exposure. [Abstract presented at the 21st Congress of the European Society of Toxicology]

80-0082. Knapek, R.; Beitz, H. (Inst. Org. Ind., Pszczyna, Poland) **Requirements for toxicological evaluation of new pesticides in Poland and G.D.R.** *Eur. Soc. Toxicol., Cong.* 21: 148; 1979.

A review of the joint Polish and GDR specifications for hygiene and toxicological evaluation of new pesticides is presented. Compounds are classified into several groups of tests, then tests are performed on laboratory and farm animals, Japanese quail, fish and bees. The acute toxicity is determined for several routes of administration. Requirements for short- and long-term studies are described. [Abstract presented at the 21st Congress of the European Society of Toxicology]

80-0083. Tamura, O. (Dep. Ophthalmol., Tokushima Univ. Sch. Med., Tokushima, Japan) **Organophosphorous pesticides as a cause of myopia in school children: a statistical study.** *Excerpta Med. Int. Congr. Ser.* 450(1): 202-206; 1979 (14 references).

The incidence of myopia among 40,000 school students was calculated annually for the period of 1957-1973. In both primary and junior high school students of both sexes the incidence of myopia has increased since 1957. The increases were particularly high, 20%, among junior high girls, and among boys, approximately 15%. Peaks in the yearly incidence of myopic condition corresponded well (correlation coefficient, r=0.90-0.95) with peaks in the amounts of organophosphorus insecticides sold, but not with the amounts of organochlorine or carbamate pesticides marketed.

80-0084. Natori, H.; Koike, M.; Kira, S. (Sch. Respir. Intern. Med., Jichi Med. Sch., Tochigi, Japan) **[Respiratory failure due to the herbicide paraquat.]** *Gendai Iryo (Mod. Med. Care)* 11(9): 1175-1182; 1979 (21 references) (Japanese).

The usual major symptoms in intoxication due to oral intake of paraquat and the method of determination of paraquat in human urine were described. The authors reported their experience on 10 cases with emphasis on the respiratory failure of 5 cases (all died after survival of 13, 20, 28, and 88 days). 3 cases died within 1-2 days after intake. No conspicuous impairment was found in the lungs; the death was caused by shock or kidney failure. In 5 fatal cases the symptoms appearing with time were: coughing, dyspnea, respiratory difficulties, tachypenia, tachycardia, cyanosis, and crepitant rales with vesicular rales. Velcro rales in cases over 2 weeks suggested interstitial pneumonia. Major findings on chest roentgenography were: widening of mediastinal shadow due to perforation of the esophagus, accentuation of pulmonary marking appearing before dyspnea, and image of pulmonary edema with wet shadow accompanying air bronchogram. Cases of longer course showed disappearance of edematous shadow and appearance of interstitial pneumoniacal shadow. 5 cases showed a respiratory failure indicated by $Pa(O_2)$ of less than 60 mm Hg or $Pa(CO_2)$ of more than 50 mm Hg. Wet lung found in the early stage of paraquat intoxication was concluded to be the morbid state of ARDS. The whole

course of transition from wet phase to interstitital pneumonia, then to rapid fibrinosis, was recognized as paraquat-lung damage.

80-0085. Galfand, M. C. (Georgetown Univ. Hosp., Washington, DC) **Hemoperfusion in drug overdose.** *J. Am. Med. Assoc.* 240(25): 2761-2762; 1978 (10 references).

A discussion on the use of hemoperfusion as a therapeutic treatment in certain cases of intoxication is presented. Where the poison involved is known to have a delayed effect, as in the case of digoxin, acetaminophen or paraquat, forced alkaline diuresis, peritoneal dialysis, and hemodialysis are often beneficial. However, toxic agents that are highly protein bound, have low aqueous solubility or are distributed poorly in plasma water are usually not dialyzable and are best removed from the body by hemoperfusion. Techniques such as collodion-albumin coating of activated charcoal and the use of XAD-4 resin as adsorbing agent have made hemoperfusion more safe for the victims of poisonings. Studies have shown hemoperfusion to be more effective in the removal of glutethimide, barbiturates and acetaminophen than hemodialysis. Other advantages of hemoperfusion include a shortening of the comatose state. However, the disadvantages and complications that may arise with the use of hemoperfusion warrant its use only in cases of severe poisoning.

80-0086. Okonek, S.; Baldamus, C. A.; Hofmann, A.; Schuster, C. J.; Bechstein, P. B.; Zoeller, B. (Cent. Detoxificat. & Poisons Informat., Med. Klin. II., Univ. Mainz, D-6500 Mainz, BRD) **Two survivors of severe paraquat intoxication by continuous hemoperfusion.** *Klin. Wochenschr.* 57(18): 957-959; 1979 (9 references).

Two cases of treatment for paraquat poisoning by continuous hemoperfusion are described. In the first case, a 16-yr-old girl had drunk a glassful of paraquat in a suicide attempt. She was admitted to the hospital with ulcerations 21 hr after ingestion. Twenty-three hr after ingestion, hemoperfusion with activated charcoal was initated along with other treatments to reduce paraquat absorption. In another suicide attempt, a 17-yr-old youth ingested 4 mouthfuls of paraquat. He was admitted to the hospital in a psychotic state, and continous hemoperfusion with activated charcoal was started 12 hr after ingestion. Both patients experienced complete recoveries after one month from the day of poisoning. Periodic sampling of paraquat levels in urine and plasma showed the increased clearance of the herbicide from the patients during hemoperfusion therapy. Hemoperfusion treatment also helped to prevent pulmonary fibrosis which often develops when paraquat is concentrated in the lungs.

80-0087. Kawai, M. (Women's Coll. Nutr., Tokyo, Japan) **[Experimental studies on the treatments of acute intoxication due to paraquat.]** *Nippon Noson Igakkai Zasshi (J. Jpn. Assoc. Rural Med.)* 28(3): 476-477; 1979 (Japanese).

In order to find a suitable method of treatment of acute intoxication due to swallowing paraquat experiments were performed on dogs (beagles) to which paraquat had been p.o. administered. Kinds of treatment were (1) p.o. administration of aluminum silicate 1 or 3 hours after paraquat administration (5 ml of 10% suspension/kg), (2) blood perfusion by active charcoal at 100 ml/min and (3) a combination of (1) and (2). Survival was longest (20 days) in group (3). Survival in group (1) was 14 days (1 hr) and 12.5 days (3 hr). Group (2) had a survival time of 7.5 days (1 hr) and 4.5 days (3 hr). The non-treated group died after 5.5 days. The concentration of parauqat in the plasma of non-treated dogs increased to a maximum of 18.5 ppm 3 hrs after administartion and then showed gradual reduction to 6.35 ppm after 10 hrs and to less than 0.1 ppm on the 3rd day. The concentration of paraquat in the plasma of group (3) was less than 3 ppm after administration when treatments began 1 hr after administation. However, it reached 8 ppm 2 hrs after administration when treatment began 3 hrs administration. Generally, the residual amount of paraquat in the liver, kidney, and lung were smallest in group (3), followed by group (2), then by (1). Liver, kidney and lung weights were higher in animals with short survival times. In conclusion, it was found that the combined treatment of p.o. administration of aluminum silicate and blood infusion via active charcoal as soon as possible after swallowing paraquat is most effective. The p.o. administration of aluminum silicate as soon as possible after swallowing paraquat was the next most effective treatment.

80-0088. Iwasaki, I. (Dep. Intern. Med., Tokyo Munic. Hosp., Tokyo, Ehime, Japan) **[Intoxication due to agricultural chemicals.]** *Rinsho To Kenkyu* 56(8): 2535-2541; 1979 (25 references) (Japanese).

This article on treating cases of intoxication due to agricultural chemicals (pesticides) is part of a series on accidents and first aid. Routes of invasion of pesticdes are clasificed as oral, dermal, and via air passages. The first aid methods of perfusion, artifical respiration, sedative and antispasmodic treatments, and facilitation of detoxifying function of the liver are described. Specific treatments for specified pesticides such as PAM for organophosphorus, BAL for heavy metals, etc. are also included. Symptoms of intoxications due to organophosphorus, carbamates, organofluorines, blasticidine S, etc. are described.

80-0089. Fisch, H. (US Army Environ. Hyg. Agency, Aberdeen Proving Ground, MD) **Primary irritation evaluation.** *US NTIS AD Rep.* AD-A021, 883: 4p.; 1975.

1- (2- ethoxybenzol) -2- ethylpiperidine was evaluated on New Zealand White rabbits for its potential to cause skin and eye irritation. The data obtained serves as a

basis for making a recommendation concerning its potential use on humans. This recommendation is intended only for guidance in further entomological testing of this compound. Further testing is not planned at this time unles the compound is shown to be superior to one currently in use. (Author abstract by permission)

See also 80-0002, 80-0008, 80-0009, 80-0015, 80-0016, 80-0020, 80-0027, 80-0034, 80-0090, 80-0091, 80-0093, 80-0097, 80-0113, 80-0115, 80-0116, 80-0122, 80-0128, 80-0220, 80-0221 *and* 80-0231.

80-0090. Fine, D. H. (Cancer Res. Div., Thermo Electron Corp., Waltham, MA 02154) **N-nitroso compounds in the workplace.** *ACS Symp. Ser.* 94: 247-254; 1979 (45 references).

Some herbicides contain appreciable levels of volatile nitrosamines. When these are applied as aqueous sprays the worker is likely to be exposed via inhalation to these toxic compounds. This article reviews the chemistry and analysis of N-nitroso compounds.

80-0091. Barbeito, M. S. (Natl. Cancer Inst., Off. Res. Saf., Bethesda, MD 20014) **Laboratory design and operation procedures for chemical carcinogen use.** *ACS Symp. Ser.* 96: 191-214; 1979 (20 references).

Various procedures designed to keep workers safe when working with chemical carcinogens are discussed. A medical surveillance program is also reviewed. Practices directly relating to personnel include the use of protective clothing, showers, pipetting, regulations concerned with eating and smoking, and personal hygiene practices. Operational practices involve the posting of access to controlled areas, protection of work surfaces, primary containment cabinets, and various practices to control the placement of the chemicals. Some of these control procedures involve labeling, storage and inventory, interlaboratory transport, housekeeping, vacuum line, packaging and shipping, and decontamination and collection along with disposal.

80-0092. McNamara, B. P. (Dep. Army, US Army Armament Res. & Dev. Command, Chem. Syst. Lab., Aberdeen Proving Ground, MD 21010) **Concepts and methodology for toxicological testing.** *ACS Symp. Ser.* 96: 215-236; 1979 (5 references).

Various governmental laws regulating the exposure of humans to toxic or hazardous chemicals are briefly cited. Guidelines for toxicological testing are listed along with the philosophies of safety evaluation. Data are presented to support the claim that commercial chemicals may be controlled on the basis of exposure risks and relatively limited toxicological data. Various toxicological tests are reviewed including those on changes in vision, reproductive effects, and behavioural changes. Indicators of precancerous states are discussed, and a general plan for toxicological testing is provided.

80-0093. Behringer, D. C.; Baladuf, F. C.; Cammarata, V. N. (Chem. Syst. Lab., Aberdeen Proving Ground, MD 21010) **Development of highly sensitive monitors for the detection of anticholinesterase compounds.** *ACS Symp. Ser.* 96: 301-315; 1979.

Two monitors for detecting levels of toxic compounds are described. The one is a rapid monitor which automatically monitors exhaust stacks and work areas while the other is a personal dosimeter worn by plant workers. Anticholinesterase compounds are detected by the enzyme colorimetric method of analysis. The monitors are more sensitive to P=O and P-O compounds than to their sulfur analogs. Carbamates have also been successfully measured with the systems.

80-0094. Lijinsky, W. (Chem. Carcinog. Program, Frederick Cancer Res. Cent., NCI, Frederick, MD 21701) **N-nitrosamnes as environmental carcinogens.** *ACS Symp. Ser.* 101: 165-173; 1979 (31 references).

Attention has been given over the past few years to studies of amines which pose a risk to humans when they are ingested. Among these amines are those used in agriculture, such as herbicidal chemicals. Of the more than 20 amines which have been tested in feeding studies of nitrite to various rats and mice, several have demonstrated positive carcinogenic responses. Tests which are being suggested for evaluating potential carcinogenic risks of exposure are discussed.

80-0095. Balo, J. (Dep. Pathol. Anat., Semmelweis Med. Univ., Budapest, Hungary) **Role of hydrazine in carcinogenesis.** *Adv. Cancer Res.* 30: 151-164; 1979 (76 references).

The physical and chemical properties of hydrazine are briefly reviewed, along with information concerning the toxicity of this chemical and the alterations it causes in the liver of rats. The natural occurrence of hydrazines in the environment and the entry of hydrazine via use of hydrazine insecticides, rocket propellents and other application are considered. The oncogenicity of isonicotinyl hydrazide is reviewed along with a review of experiments concerning the tumorigenicity of hydrazine compounds and the production of polyps and tumors in the intestinal canal. Information is also given on the methylhydrazine derivatives and the use of hydrazine therapy for Hodgkin's Disease.

80-0096. Paulov, S. (Comenius Univ., Bratislava, Czechoslovakia) **Ucinky herbicidu dinoseb-acetatu na zivotaschopnost' a telove bielkoviny dafnii. [The effect of the dinoseb-acetate herbicide on the viability and body proteins of daphniae.]** *Agrochemia* 19(7): 197-198; 1979 (10 references) (Czech).

Daphniae (*Daphnia magna*) in water with a 0.1 mg/l content of dinoseb- acetate (Aretit) were found to die within 24 hr. The daphnia acted as a sensitive indicator of the contamination of the water with this herbicide. Contaminated daphniae also showed a change in the level and composition of free body proteins.

80-0097. Miura, O.; Sasaki, S.; Kagaya, S.; Watabe, K.; Sugaya, H. (Inst. Rural Med., Hiraga Gen. Hosp., Hiraga, Akita, Japan) **[Residue of paraquat in organs of three patients intoxicated by paraquat in 1978.]** *Akita Noson Igakkai Zasshi (Akita J. Rural Med.)* 26(1): 86-87; 1979 (Japanese).

Three cases of paraquat intoxication (2 suicides) were experienced in 1978 in the authors' hospital. Amounts of residue of paraquat in their blood, urine, and organs are reported as follows: kidney 41.25, 37.86, and trace mg/g: 4.50 mg/ml, and trace; stomach contents 5.19, 17.50, and N.D. mg/g; urine 234.4, 862.5, and 1.0 mg/ml. Survival times were 21 and 20 hours and 102 days after the intake of 80 to 100 ml of 24% liquid formulation, 50 ml of 24% liquid formulation, and one mouthful of a 20 fold dilution of paraquat. Appropriate treatment was determined to be p.o. administration of aqueous NaCl solution, gastric wash, p.o. administration of 30% aluminum silicate suspension, administration of a laxative, blood dialysis, haemoperfusion by active carbon and forced diuresis, oxygen respiration at a low flow rate, administration of steroid plus antibiotics, and administration of ascorbic acid, azathiopurin and potassium aminobenzoate.

80-0098. Jaffee, O. C.; Mitrosky, S. (Dep. Biol., Univ. Dayton, Dayton, OH) **The effect of an organophosphate insecticide (Azodrin) upon cardiovascular development.** *Anat. Rec.* 194(4): 630; 1979.

In order to study the metabolic basis for cardiovascular development, the insecticide Azodrin (monocrotophos), which is extremely soluble and presumed to inhibit NAD enzymes, was injected into air sacs of stage 18 (70 hour incubation) chick embryos. The embryos were reincubated to 16 days. At a dose of 1.5 mg Azodrin, 50 of 70 embryos survived, compared to 40 of 41 control embryos. There were cardiovascular malformations in 15 of the treated survivors, and in only one of the control survivors. The most frequent malformation was double outlet right ventricles, with "tubular hearts" and ventricular septal defects also found. There were frequent micromelia limb defects. Studies in which O_2 uptake by injected hearts was measured by oxygen electrode showed that 48 hours after injection myocardial uptake of experimental hearts averaged 14.6 μl/mg protein, compared to control values of 15.7 μl/mg.

80-0099. Streit, B. (Zool. Inst. CH-4051 Basel, Switzerland) **Aufnahme, Anreicherung und Freisetzung organischer Pestizide bei benthischen Susswasserinvertebraten. 1. Reversible Anreicherung von Atrazin aus der wasserigen Phase. [Uptake, accumulation, and release of organic pesticides by benthic freshwater invertebrates. 1. Reversible accumulation of atrazine from aqueous solution.]** *Arch. Hydrobiol., Suppl.* 55(1): 1-23; 1978 (24 references) (German).

The uptake and elimination kinetics of and the sorption kinetics for ^{14}C- ring- labeled triazine (specific activity 7.15-27.8 μCi/mg was studied in *Ancylus fluviatilis, Glossiphonia complanata, Helobdella stagnalis,* and *Prodiamesa olivavae* (larvae) at 19°C and at pH 7-9. The triazine uptake was described as a hyperbolic functon of time. The sorption capacity increased with increasing concentration in the medium as well, but the accumulation factor (calculated as concentration within the animal on a fresh weight basis to that in the water) decreased. The elimination of atrazine followed an exponential functon in *A. fluviatillis* and in *G. complanata.* Yet, within the first 20 min or so, a very strong elimination is found. The elimination half-time averaged 227 and 220 min, respectively. It was impossible to find a level at which no further elimination occurred. The snail shell showed a two-step elimination. The atrazine concentration in the different organs of *A. fluviatilis* was directly correlated with the lipid content, being 4.5 times higher in the mid-gut gland with high lipid level than in the rest of the animal.

80-0100. Ireland, C. M.; Gull, K.; Gutteridge, W. E.; Pogson, C. I. (Biol. Lab., Univ. Kent, Canterbury, Kent CT2 7NJ, England) **The interaction of benzimidazole carbamates with mammalian microtubule protein.** *Biochem. Pharmacol.* 28(17): 2680-2682; 1979 (15 references).

Clinical and agricultural benzimidazole compounds are discussed with respect to their structure-function relationships and interactions in varying antihelmintic drug efficacy. Sheep brain microtubule protein was purified, depolymerized, and clarified and the time-course assemblies in the presence of varying concentrations of parbendazole, oncodazole, fenbendazole, oxibendazole, mebendazole, albendazole, cambendazole, oxfendazole, thiabendazole, and benzimidazole were determined. Correlations of the *in vivo* effectiveness of the benzimidazole carbamates on infections of *Nematospiroides dubis* in mice were also determined. No absolute correlation was found between antimicrotubular activity and anthelmintic action, athough some of the compounds exhibited some degree of effectiveness. It is suggested that the colchicine binding sites of the proteins may be used as targets for eukaryotic chemotherapy.

80-0101. Manis, J. (Div. Gastroenterol., Dep. Med., Downstate Med. Cent., State Univ. New York, Brooklyn, NY 11203) **Stimulation of iron absorption by various polyhalogenated aromatic hydrocarbon environmental contaminants.** *Biochem. Pharmacol.* 28(18): 2841-2843; 1979 (14 references).

Groups of male Sprague-Dawley rats were given 0.2 ml dioxane with or without test doses of PBB (200 mg/kg) or dieldrin (500 mg/kg) by gastric tube. The sequential steps in iron absorption, uptake at the mucosal surface and transfer to the blood stream were estimated.

Dieldrin and the fire-retardant PBB significantly increased both steps in the Fe absorption mechanism. The greatest effect was on the transfer to the bloodstream, which was increased by 31 and 68% by PBB and dieldrin, respectively. Mucosal uptake was also increased ($p < 0.02$). Of twelve other hydrocarbons similarly tested, PCT 5032, PCT 5042, and PCB 1268, also significantly increased ($p < 0.02$, $p < 0.02$, and $p < 0.001$, respectively); while mirex decreased ($p < 0.001$) aerosal Fe transfer.

80-0102. Stratford, M. R. L.; Snell, K. (Dep. Biochem., Univ. Surrey, Guildford, Surrey GU2 5XH, England) **The effects of *p,p'*-DDT [1,1,1- trichloro- 2,2-bis (p-chlorophenyl) ethane] on carbohydrate metabolism in the developing neonatal rat.** *Biochem. Soc. Trans.* 7(5): 902-904; 1979 (8 references).

Developing rats were exposed to DDT via the mother by feeding 20 ppm to rats 4 weeks prior to mating, throughout gestation, and during suckling. At no time did the mothers of their progeny show any overt toxic symptoms or gross behavioral changes. Pyruvate kinase accumulation was retarded during weaning and slight increases were noted in phosphoenol pyruvate carbosykinase, fructose 1,6- biphosphatase and glucose 6-phosphatase activities during the mid-suckling period. It was concluded that the period of substantial accumulation of DDT during the transmission of DDT contamination milk from the mother to the young had no untoward effect on carbohydrate metabolism in the offspring. Nor was there any significant effect on the final pattern of lipolytic, glycolytic or gluconeogenic enzyme in the adult.

80-0103. Miadokova, E.; Vlcek, D.; Podstavkova, S. (Dep. Genet., Comenius Univ., Bratislava, Czechoslovakia) **Testovanie toxickeho a mutagenneho ucinku' systemoveho fungicidu trimorfamidu na bakteriach. [Study of the toxic and mutagenic effects of the systemic fungicide trimorfamid on bacteria.]** *Biologia (Bratislava)* 34(3): 227-231; 1979 (15 references) (Czech).

Spot test and soft agar overlay methods employing *E. coli* WP2, WP 2uvrA, and *Salmonella typhimurium* TA 98 and TA 100 were used to test the toxic and mutagenic effects of a newly synthesized systemic fungicide. Only the highest concentrations of the fungicide elicited toxic responses in any of the bacterial strains. Comparisons of the frequency of spontaneous revertants with the frequency of trimorfamid- related revertants showed that th fungicide had no mutagenic effects.

80-0104. Crampton, F. L.; Gichanga, M. M. (Wellcome Kenya Ltd., Kabete, Kenya) **A survey of resistance to acaricides in economically important Ixodida (Acari) of the major cattle-raising areas of Kenya.** *Bull. Entomol. Res.* 69(3): 427-439; 1979 (7 references).

Larval progeny of ticks were immersed in serial dilutions of acaricides in water during their third wk of life. Formulations employed included toxaphene, dioxathon, dieldrin, chlorfenvinphos, carbaryl, chlorpyrifos, and bromosphos-ethyl. Various species of tick were tested including *Boophilus decoloratus, Rhipicephalus evertsi evertsi, Rhipicephalus appendiculatus,* and *Amblyomma variegatum.* Toxaphene appeared non-effective in at least the *B. decoloratus* and *R. e. evertsi* tests. However the majority of strains of *Amblyomma spp* were susceptible to toxpahene as were the *Hyalomma* sp. None of the species tested was resistant to dioxathion. Only *R. sanguineus* showed resistance to organophosphorus chemicals. No identifiable resistance distribution pattern of the tested strains emerged. However, it was noted that single host strains were more likely to become resistant than multi host strains.

80-0105. Nigam, S. K.; Lakkad, B. C.; Karnik, A. B.; Thakore, K. N.; Bhatt, D. K.; Babu, K. A.; Kashyap, S. K. (Natl. Inst. Occup. Health, Meghani Nagar, Ahmedadab 380016, India) **Effect of hexachloro cyclohexane feeding on testicular tissue of pure inbred Swiss mice.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 431-437; 1979 (12 references).

Studies were performed on Swiss mice to determine the effect of hexachloro cyclohexane (BHC) on testicular tissues. Mice were fed 500 ppm BHC, and 6 animals were sacrificed every month for 10 months. Organ weights were taken and histological examination were performed on the testes. Controls showed no changes in testes weight, hypertrophy or atrophy, and histological examination of controls showed them to be normal. The 3-8 month treatment groups showed an increase in tesicular weight. Fluid-filled, degenerative seminiferous tubules and damaged spermatogenic cells were observed. It is concluded that BHC has a significant effect on the testes of mice.

80-0106. Neskovic, N.; Milosevic, M.; Klajic, R. (Dep. Pestic., YU-11080, 11080 Zemun, Yugoslavia) **Cytochrome P-450 content and NADPH cytochrome *c* reductase activity in rats treated with carbaryl and propoxur.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 438-444; 1979 (13 references).

Studies were performed to determine the effects of the pesticides carbaryl and propoxur on the hepatic content of haemoprotein and enzymatic activity. Microsomes were isolated from the livers of rats treated with carbaryl (6.0 and 12.0 mg/kg, orally) and propoxur (1.0 and 2.0 mg/kg orally) for 30 days. Analyses were performed on days 5, 10, 20 and 30 after dosage was begun. After 5 days the females of the carbaryl group showed a NADPH-cytochrome c reductase activity of 52.5 and 46.5 for 6 and 12 mg/kg respectively. Controls showed an activity of 57.4. After that period, however, no statistically significant differences

between groups (treatment and control) occurred, with one exception, the 12 mg/kg treatment after 60 days. The male carbaryl group showed significant differences at all test periods. Propoxur tended to reduce activity at most test periods. Cytochrome P-450 concentrations in female rats increased at all time periods from doses of both pesticides. Levels in males increased after 5 days, but decreased during the other periods for both pesticides.

80-0107. Shivanadappa, T.; Ramesh, H. P.; Krishnakumari, M. K. (Discipline Infestation Control & Pestic. Cent. Food Technol. Res. Inst., Mysore 570013, India) **Rodenticidal poisoning of non-target animals: acute oral toxicity of zinc phosphide to poultry.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 452-455; 1979 (5 references).

Studies were performed in which chickens were fed zinc phosphide, a rodenticide, to determine the effects on non-target animals. Female domestic fowl were fed either 14.0, 21.0, 31.5 or 47.2 mg/kg, observed for 4 weeks, then killed and autopsied. The mortality rate was somewhat dose dependent. Fourteen mg/kg resulted in 12% mortality; 87% of the birds fed both the 21 and 31.5 mg/kg doses died; 100% of the birds fed 47.2 mg/kg died. Weight gain in the low dose group was normal after the first week. Autopsy results showed that some cell infiltration occured in the lungs and gizzards of treated birds, but all other organs appeared normal.

80-0108. Miller, R. W.; Cecil, H. C.; Carey, A. M.; Corley, C.; Kiddy, C. A. (Agric. Res. Sci. & Educ. Adm., USDA, Beltsville, MD 20705) **Effects of feeding diflubenzuron to young male Holstein catle.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 482-486; 1979 (12 references).

Studies were performed to determine the effect of diflubenzuron on cattle. Four pairs of Holstein bull calves were used, one from each pair serving as a control. Experimental animals were fed a food concentrate containing 100 ppm diflubenzuron. Blood samples were routinely drawn for analysis of the pesticide and serum testosterone. Controls gained an average of 995 g per day and treated animals gained 983 g per day (not a significant difference). Serum hormone concentrations were not significantly different between control and treatment groups. No abnormalities in either group were found at autopsy. It was concluded that bulls can consume up to 1 mg/kg diflubenzuron/kg/day without affecting growth or organ histopathology.

80-0109. Stooff, W. (Natl. Inst. Water Supply, Chem. Biol. Div., Leidschendam, Netherlands) **Detection limits of a biological monitoring system based on fish respiration.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 517-523; 1979 (12 references).

A discussion of the value of dual external electrodes for measuring breathing movements of fish is presented. Fish were placed in chambers with electrodes and frequency filters designed to detect and record only the movements of gills. After breathing rates normalized, toxicants (including α- hexachloro cyclohexane (lindane) and penta chlorophenol) (PCP) were introduced and added continuously. When respiration frequency of three-fourths of the test fish exceeded predetermined critical levels, it was considered that the substance was toxic. In most cases sublethal concentrations caused a toxic response. Since the biological monitoring system described is for protecting human health, results were compared to LC_{50} values for rats. The method described was able to detect compounds far below the critical levels for rats.

80-0110. Siddaramappa, R.; Watanabe, I. (Int. Rice Res. Inst., Los Banos, Phillippines) **Evidence for vapor loss of ^{14}C carbofuran from rice plants.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 544-551; 1979 (2 references).

Studies were performed to determine vapor loss rates of the pesticide carbofuran from rice plants. In experiment 1 seedlings were placed through a hole in a stopper with the roots in a solution of ^{14}C carbofuran and kept in the dark. In experiment 2 seedlings were treated in the same way, but exposed to light. In experiment 3 the carbofuran in vapor was trapped in ethylene glycol from plants grown as in experiment 1. Solutions of radioactive pesticides were analyzed by liquid scintillation counting. Radioactivity was also determined in leaf blades, stems, and roots. After 10 days, about 2/3 of the radioactivity was lost from the solution in experiment 1. There was a slight accumulation in the plant parts--0.128, 0.026, and 0.155 x 10^4 cpm in leaves, stems and roots, respectively; 2.021 x 10^4 cpm were unaccounted for. Experiment 2 showed that lighted conditions cause a greater loss of pesticide by vaporization. More transpiration loss was observed under higher conditions. The vapor loss of radioactivity was seen to increase rapidly up to 10 days, compared to a gradual increase up to 20 days in root zone application.

80-0111. Zaffaroni, N. P.; Zavanella, T.; Arias, E. (Ist. Zool., Univ. Milano I-20133, Milan, Italy) **Peripheral blood cells in the crested newt after long-term exposure to the fungicide manganese ethylene bisdithio carbamate (maneb).** *Bull. Environ. Contam. Toxicol.* 23(4-5): 587-591; 1979 (12 references).

Studies were performed to determine the effects of the fungicide maneb on the blood cells of newts. Starved newts were exposed to 0.5, 2.5 and 5.0 ppm maneb for 19-23 weeks. Fed newts were exposed to 5 ppm for 37-40 weeks. After exposure they were sacrificied; blood samples were drawn and analyzed. No significant changes in the proportions of white blood cells or thrombocytes occurred. A 40-60% decrease in erythroblasts occurred at 5 ppm maneb with males of the starved group.

80-0112. Chowdary, V. D.; Rao, P. V.; Narayanan, R. (Dep. Zool., Sri Venkateswara Univ. Tirupati, Andhra Pradesh, India) **Effect of copper sulfate and sodium pentachloro phenate on adenine and adenosine phosphates in *Lymnaea luteola* (Mollusca: Gastropoda).** *Bull. Environ. Contam. Toxicol.* 23(4-5): 615-619; 1979 (20 references).

Studies were performed to determine the effects of the molluscicides copper sulfate and sodium pentachloro phenate (NaPCP) on the AMP, ADP, and ATP of the snail *Lymnaea luteola*. 25 snails were placed in 2 ppm copper sulfate for 15 hours, and 25 were placed in 2 ppm NaPCP for 10 hours. Controls were kept in deionized tap water. At the end of the exposure periods the animals were sacrificed, and ATP, ADP and AMP were anlyzed by ion-exchange chromatography. After the twelfth hour the copper sulfate group started dying; 50% had died by 15 hours. Fifty percent of the NaPCP group died after 10 hours. The copper sulfate group maintained 92% of the normal (control) ATP level, and 72% was maintained in the NaPCP group. The ATP/ADP ratio did not change in the copper sulfate group, but the ATP/AMP ratio increased. Both parameters decreased in the NaPCP group. The results are discussed in terms of the mechanisms for molluscicidal activity.

80-0113. Sandifer, S. H.; Wilkins, R. T.; Loadholt, C. B.; Lane, L. G.; Eldridge, J. C. (South Carolina Pestic. Epidemiol. Stud. Cent., Med. Univ. South Carolina, Charleston, SC) **Spermatogenesis in agricultural workers exposed to dibromochloro propane (DBCP).** *Bull. Environ. Contam. Toxicol.* 23(4-5): 703-710; 1979 (6 references).

A study was performed to determine the effects of dibromochloro propane (DBCP) exposure on spermatogenesis. Blood and semen samples were collected from 73 agricultural workers from 6 different states. Custom applicators had the lowest sperm count (2.7×10^6/ml). Formulators had the next lowest (12.1×10^6/ml). Farmers had 17.8×10^6/ml. Researchers and salesman had the highest counts, 101.5 and 73.0×10^6/ml, respectively. Serum FSH and LH levels were highly negatively correlated to sperm counts. The study shows that the effects of this pesticide varies among different occupational groups that are exposed to varying amounts.

80-0014. Rosival, L.; Szokolay, A.; Grunt, J. (Res. Inst. Prevent. Med., Bratislava, Czechoslovakia) **Transplacentarny prechod pesticodov DDT a HCH do l'udskych embyri. [Transplacental transfer of pesticides DDT and HCH into human embryos.]** *Cesk, Hyg.* 24(6-7): 346-355; 1979 (7 references) (Czech).

The placental transfer of DDT and HCH (BHC) into human embryos was discussed. Three hundred and forty six samples were examined (uterus contents after abortion, placenta, embryo, and samples taken during ceasarian sections). The median values in the uterus contents for the West Slovak region were: DDT 0.119 mg/kg, β-HCH (β-BHC) 0.042 mg/kg, and γ-HCH (lindane) 0.40 mg/kg. For the Central Slovak region they were: E-DDT 0.86 mg/kg, β-HCH 0.001 mg/kg, and γ-HCH 0.012 mg/kg. Median values in placenta samples (West Slovak region) were EDDT 0.070 mg/kg, β-HCH 0.014 mg/kg, and γ-HCH 0.024 mg/kg. Embryo samples contained 0.108 mg/kg EDDT, 0.009 mg/kg β-HCH, and 0.018 mg/kg γ-HCH. Caesarian section samples were blood (East Slovak region), placenta, and fat. The median values for blood were: EDDT 0.36 mg/kg, β-HCH 0.001 mg/kg, and γ-HCH 0.018 mg/kg. Placenta samples contained 0.039 mg/kg E-DDT, 0.001 mg/kg β-HCH, and 0.018 mg/kg γ-HCH. Fat samples contained 4.410 mg/kg EDDT, 0.163 mg/kg β-HCH, and 0.028 mg/kg γ-HCH. The women observed were not found to suffer from increased disorders during pregnancy.

80-0115. Schubert, H. (Hautklinik. Med. Akad., DDR-5010 Erfurt, DDR) **Allergisches Konaktekzem durch Propachlor. [Allergic contact dermatitis due to propachlor.]** *Dermatol. Monatsschr.* 165(7): 495-498; 1979 (13 references) (German).

A 29-year-old male farm worker handling a 10% suspension of propachlor (Ramrod) developed erythemato papulous contact eczema of both hands and fingers after an 8-day exposure. He wore rubber gloves during work only occasionally. The eczema healed completely after complete cessation of the contact with this herbicide. Other workers who were similarly exposed to propachlor did not develop eczema, and the patient had handled Ramrod without complications 4 weeks earlier. The epicutaneous test with 1% propachlor was positive after 2 and 3 days, but five control persons did not react to this substance.

80-0116. Grigorowa, R.; Gohlke, R.; Rothe, R. (Zentralinst. Arbeitsmed. DDR, DDR-1134 Berlin, DDR) **Beitrag zur Toxizitaet Dithiocarbamate am Beispiel einer Zinebintoxikation. [Toxicity of dithiocarbamates - exemplified by zineb intoxication.]** *Dtsch. Gesundheitswes.* 34(9): 393-395; 1979 (22 references) (German).

The role of alcohol in zineb intoxication is discussed. A moped driver was exposed to Bercema Zineb (zineb) while driving near a field that was being aerially sprayed. Acute zineb alcohol intoxication was accompanied by a chronic fatty degeneration of the liver and ended in death. A maximum permissible concentration value of 0.5 mg/m³ for the DDR is recommended by the authors based on toxicity data found in literature and relevant experience.

80-0117. McDonald, T. O. (Tulane Univ., New Orleans, LA 70118) **Comparison of the effects of parathion and**

DDT on the concentrations of serotonin, norepinephrine and dopamine in the brain and retina/pigment epithelium/choroid of the goldfish. *Diss. Abstr. Int. B* 40(3): 1073; 1979.

Norepinephrine (NE), 5- hydroxytryptamine (5-HT) and dopamine (DA) were extracted from the brains and retina/pigmented epithelium/choroid complexes of goldfish every 4 hours for 24 hours and their concentrations determined spectro photofluoro metrically. Twenty-four hour rhythms were found in the levels of 5-HT, NE and DA in both tissues. Maximum amounts of 5-HT and DA in the eye tissue were correlated positively to the reported period of cone and rod, respectively, outer segment shedding. Intraperitoneally injected DDT elevated brain 5-HT and decreased brain NE and DA while it elevated the eye tissue 5-HT, decreased DA and left unchanged NE. Intraperitoneally injected parathion lowered brain 5-HT and NE but did not alter DA while NE was decreased in the retina/pigment epithelium/choroid but 5-HT and DA were unchanged. DDT altered these neurotransmitters levels by its effect on MAO (decreased) and COMT (increased) activities. Parathion influenced the brain and eye concentrations of these biogenic amines by apparently altering tyrosine hydroxylase. (Author abstract by permission. Copies of the thesis are available from University Microfilms, order no. 7920399)

80-0118. Spain, J. C. (Univ. Texas, Austin, TX) **The bacterial degradation of *p*-nitrophenol.** *Diss. Abstr. Int. B* 40(3): 1168; 1979.

Nitroaromatic compounds are widely used in the manufacture of dyes, explosives, plastics, and insecticides. One such compound, *p*-nitrophenol, is released into the environment in significant quantities through the use of the organophosphorus insecticide parathion and its analogues. Hydrolysis of the parent compounds by soil microorganisms releases *p*-nitrophenol. The present work describes the selection and isolation of serveral bacteria able to degrade *p*-nitrophenol. From one of the isolates, a *Moraxella* species, an enzyme was separated and partially characterized that catalyzed the conversion of *p*-nitrophenol to hydroquinone with release of the nitro group as nitrite. The enzyme was associted with the particularte fraction of cell extracts. Oxygen and reduced pyridine nucleotides were required for *p*-nitrophenol oxidation and flavin adenine dinucleotide stimulated the activity. The incorporation of molecular oxygen during the reaction was demonstrated by mass spectroscopic analysis of hydroquinone produced in the presence of oxygen-18. The enzyme was specific for 2p-nitrophenol and did not release nitrite from any of a number of related nitroaromatic compounds. (Author abstract by permission. Copies of the thesis are available from University Microfilms, order No. 7920216)

80-0119. Ross, J. H.; Lim, L. O.; Krieger, R. I. (Dep. Environ. Toxicol., Univ. California, Davis, CA 95616) **Herbicidal potency of 1,1'- alkyl-4,4'- bipyridylium salts as a function of their physicochemical constants in duckweed.** *Drug Chem. Toxicol.* 2(3): 193-205; 1979 (27 references).

The herbicidal properties of various viologen [methyl (paraquat), propyl, isopropyl, butyl, methylpentyl, hexyl, octyl, and benzyl] salts to duckweed (*Spirodela oligorrhiza*) were determined. The lowest effective herbicidal dose was 2.7, 12, 13, and 31 μM for methyl, propyl, octyl, and methylpentyl viologens, respectively, while 236 *M* isopropyl viologen was needed to cause chlorosis and bleaching of the plants. Growth inhibition occured at concentrations less than necessary to produce chlorosis. Comparisons of structure- activity relationships indicated that compounds with the least bulky side chains were the most phytotoxic.

80-0120. Ross, J. H.; Krieger, R. I. (Dep. Environ. Toxicol., Univ. California, Davis, CA 95616) **Toxicity of 1,1'-alkyl- 4,4'- bipyridylium salts in the rat.** *Drug Chem. Toxicol.* 2(3): 207-222; 1979 (47 references).

Sprague-Dawley rats receiving sc injections (right thigh) of various dosage levels of methyl (paraquat), isopropyl, butyl, methyl-pentyl, hexyl, octyl and benzyl viologens. Lowest lethal doses (LLD), defined as sc doses causing death after 11 days, were 11.9 and 47 μmol/kg for benzyl and methyl viologens. In contrast, large doses of propyl viologens (166-237 μmol/kg) were required to cause death after 17 days. Lethal doses produced common signs, including pilo-erection around the scapulae and, later, the whole body; weight losses; marked swelling around the injection site; dyspnea and torpidity after 24 hr; exudate around the nares; and lung hemorrhaging. Non-emptying of the stomach, and adrenal enlargement were indicative that the adrenals may play a role in viologen toxicity.

80-0121. Dalvi, R. R.; Ashley, W. M. (Toxicol Lab., Dep. Physiol. & Pharmacol., Sch. Vet. Med., Tuskegee Inst., Tuskegee, AL 36088) **Protective effect of glutathione on the *in vitro* inhibition of hepatic cytochrome P-450 by captan.** *Drug Chem. Toxicol.* 2(3): 245-255; 1979 (19 references).

Liver microsomal preparations from male Sprague-Dawley rats pretreated with phenobarbital were incubated with various concentrations (0-100 μM) of captan. Concentrations necessary to produce 50% loss of cytochrome P-450 (I 50) were determined from plotted inhibition curves. Twelve μM concentrations of captan were sufficient to reach the I 50 level, indicating that the pesticide is a strong *in vitro* inhibitor of the hemoprotein. The addition of the chelating agent EDTA failed to prevent the loss of cytochrome P-450 by captan. Additions of 0.5 m*M* reduced glutathion, however, afforded complete protection from the inhibitory effects of captan.

80-0122. Sawinsky, A. (Scolnok Cty. Public Health Cent., Scolnok, Hungary) **Komplex szemlelet a munkaegeszsegugyi vizsgalatokban. [Complex approach to industrial hygienic studies.]** *Egeszsegtudomany* 23(3): 213-220; 1979 (33 references) (Hungarian).

Personal occupational hygienic studies on the effects of ionizing radiation, vibration, and chemical substances, including pesticides, are reported. The inhalative and skin exposure of farm workers to Lebaycid (fenthion), Bi-58, Ultracid (methidathion), Vapona (dichlorvos), and Sumithion (fenitrothion) was studied. The in-air concentrations were 1.18 mg/m³ for Lebaycid 50 EC, 0.29 mg/m³ for Bi-58, 1.19 mg/m³ for Vapona, 0.83 mg/m³ for Sumithion, and 1.09 mg/m³ for Ultracid. The skin contamination (in mg/100 cm²/hr) was 0.21 for Lebaycid, 0.09 for Bi-58, 0.07 for Vapona, 0.04 for Sumithion, and 0.19 for Ultracid. The acute poisoning levels were not reached; the exposed workers showed no subjective or objective symptoms, and there was no decrease in cholinesterase activity. In another experiment, chromosome aberrations were found in the bone marrow cells of experimental animals following the administration of a single ip dose of DDVP (dichlorvos). The effect was dose-dependent.

80-0123. Rady, P.; Arany, I.; Bojan, F. (Public Health & Epidemiol. Inst. Debrelcen Med. Sci. Univ. Debrecen, Hungary) **Az uretan, dimetilnitrozamine, Paraquat es butilalt hidroxitoluol hatasa az egar-tudo tejsavdehidrogenaz aktivitasara es isoenzim spektrumara. [Effects of urethane, dimethylnitrosamine, paraquat, and butylated hydroxytoluene on the activity of lactic acid dehydrogenase and is isoenzyme spectrum in the mouse lung.]** *Egeszsegtudomany* 23(3): 251-255; 1979 (19 references) (Hungarian).

The effects of paraquat (single 20 mg/kg dose ip), butylated hydroxytoluene (BHT; 800 mg/kg ip), urethane (1000 mg/kg ip), and dimethylnitrosamine (DMMA, 10 mg/kg ip) on the activity and isoenzyme spectrum of lactate dehydrogenase (LDH) in the lungs of 6-8 wk old male and female LATI:CELP mice were studied. The noncarcinogenic substances (paraquat and BHT) caused only a temporary increase in the LDH activity. In the animals treated with paraquat, the LDH activity reached its maximum approximately 2 days after treatment, but it dropped nearly to the initial level by day 10. The H:M isoenzyme ratio was 0.381 on day 2 and 0.729 on day 7 after the paraquat treatment.

80-0124. Hirose, Y.; Yasuno, M. (Dep. Parasitol., Inst. Med. Sci., Tokyo Univ., Tokyo, Japan) **[Toxicity test of some molluscicides with juveniles of the guppy, *Poecilia reticulata*.]** *Eisei Dobutsu (Jpn. J. Sanit. Zool.)* 30(2): 167-171; 1979 (11 references) (Japanese).

The toxicities of three kinds of molluscicides, niclosamide, B-2 (sodium 2,5-dichloro- 4-bromophenol) and Yurimin (3,5- dibromo- 4-hydroxy- 4'-nitrozaobenzene), were tested against juvenile *Poecilia reticulata* at 0, 2, 6, 10, 14 and 18 days of hatching. Breakers containing 200 ml of the individual molluscicides and 10 fish were observed for 24 hr. It was found that the susceptibility of juvenile *P. reticulata* to the molluscicides gradually changed from day 10 and showed a link with the feeding schedule. The toxicity of B-2 (24 LC50) was 0.9 ppm without feeding, and 1-1.5 ppm with feeding. The LC50 of niclosamine was 0.2-0.4 ppm without feeding, The toxicity of Yurimin was the highest of the molluscicides tested; its LC50 was less than 0.2 ppm.

80-0125. Nenov, P.; Ribarova, F. (Inst. Nutr., Med. Acad., Sofia, Bulgaria) **Eksperimentalni prouchvaniya vurkhu produlzhitelnostta na kheksobarbitalovata narkoza i nivoto na tsitokhromite P-450 i B5 v mikrozomnata fraktsiya na cherniya drob na plukhove sled tretirane s propoksur. [Experimental studies on the duration of hexobarbital necrosis and the level of cytochromes P-450 and B5 in the microsomal liver fraction of rats after treatment with propoxur.]** *Eksp. Med. Morfol.* 17(3): 118-121; 1978 (17 references) (Bulgarian).

The effect of long-term treatments with propoxur (0.1 LD50, corresponding to 10 mg/kg/day po for 60 consecutive days) on the cytochrome P-450 and B_5 levels in the microsomal fraction of the liver and on the duration of hexobarbital induced sleep were studied in 180 ± 20 g, male, adult, Wistar rats. At the end of the first week increased levels of cytochrome P-450 (67.9 ± 6.5 nmol/g liver wt/100 g body wt) and B_5 (96.2 ± 12.8 nmol/g liver wt/100 g body wt) when compared to controls (38.5 and 33.7 nmol/g liver wt/100 g body wt, respectively). The cytochrome P-450 and B_5 levels were also increased when expressed in moles/g microsomal protein (1.17 and 1.72, respectively, versus 0.82 and 0.79, respectively, in controls). The duration of hexobarbital induced sleep was reduced significantly after treatment for 8 days (18.8 ± 0.94 min versus 24.3 ± 1.61 min in controls) and for 30 days (18.3 ± 1.56 min; $p < 0.05$). The findings indicate the hepatic inducing effect of propoxur in rats.

80-0126. Harri, M. N. E.; Laitinen, J.; Valkama, E. L. (Dep. Physiol., Univ. Kuopio, SF-70101 Kuopio 10, Finland) **Toxicity and retention of DDT in adult frogs, *Rana temporaria*L.** *Environ. Pollut.* 20(1): 45-55; 1979 (20 references).

DDT toxicity studies were carried out on adult summer frogs (*Rana temporaria*). In frogs given single oral doses of 1-200 mg DDT/kg, the LD50 was determined to be 7.6 mg/kg. In subchronic toxicity studies, frogs were given an oral dose of 0.6 mg/kg twice weekly for a total of 16 doses. No signs of toxicity were observed in frogs that were fed at the time of dosing, but unfed frogs showed

clear evidence of poisoning. DDT retention was followed using (^{14}C) labeled DDT (about 5μCi/animal). Most accumulation was found in fat, moderate amounts in kidney and nervous tissue, and only small amounts in skeletal or heart muscle. Autoradiographical study showed considerable radioactivity in bones and spleen. DDT disappearance was enhanced by previous DDT treatment. It is suggested that DDT induces the activity of drug-metabolizing enzymes which may lead to increased biliary excretion of DDT. The use of frogs as bioindicator organisms is discussed.

80-0127. Ausmus, B. S.; Kimbrough, S.; Jackson, D. R.; Lindberg, S. (Ecol. & Ecosystems Analy. Sect., Battelle Columbus Lab., Columbus, OH 43201) **The behaviour of hexachlorobenzene in pine forest microsomes: transport and effects on soil processes.** *Environ. Pollut.* 20(2): 101-111; 1979 (14 references).

Litter contaminated with HCB at levels of 0.085, 0.730, and 7.42 mg/m^3 was applied to replicate forest soils in filtered, flow-through microcosm systems. Both volatilization and leaching were important factors in the removal of HCB from the litter-soil systems. Carbon dioxide efflux decreased and the calcium loss increased in the HCB-treated microcosms.

80-0128. Mueller, B.; Schroder H. (Chem. Untersuchungsamt Hagen, D-5800 Hagen, BRD) **Biozide in menschlichem Fettgewebe und Muttermilch. Diskussionsbeitrag zum Problem der Saeuglingernaehrung. [Biocides in human fat and human milk. Discussion on the infant nutrition problem.]** *Ernaehr. Umschau* 25(7): 205-209; 1978 (15 references) (German).

Sixty-four human milk samples, collected within the first week after delivery, 40 samples of adapted or partially adapted baby food on cow milk basis, seven samples of powdered milk, and 25 samples of normal cow milk were analyzed for organochlorine pesticide residues by gas chromatography. In addition, 50 abdominal fat samples obtained from women, 30-60 yr old, during surgery were also analyzed. The mean residue levels found in the human depot fat samples were 0.22 mg/kg for DDT, 0.41 mg/kg for for DDD, 1.67 mg/kg for DDE, 2.30 mg/kg for total DDT, 2.98 mg/kg for hexachlorobenzene (HCB), < 0.01 mg/kg each for α- and β- BHC and lindane, 0.05 mg/kg for pentachlorobenzene, and 3.00 mg/kg for PCBs. The mean values found in the human milk samples were 0.19 mg/kg for DDT, 0.29 mg/kg for DDD, 1.51 mg/kg for DDE, 1.85 mg/kg for HCB, 0.01 mg/kg for α-BHC and lindane, 0.02 mg/kg for β-BHC, 0.05 mg/kg for pentachlorobenzene, and 1.90 mg/kg for PCBs. The levels found in cow milk (on fat basis) were 0.01 mg/kg for DDT, 0.02 mg/kg for DDT, 0.03 mg/kg for DDE, 0.10 mg/kg for HCB, 0.02 mg/kg for α-BHC, < 0.01 mg/kg for lindane, and 0.07 mg/kg for PCBs. The baby foods contained 0.01 mg/kg DDT, DDD, and DDE each, 0.02 mg/kg HCB, < 0.01 mg/kg α- and β-BHC, lindane, and pentachlorobenzene each, and 0.07 mg/kg PCBs. The average residue levels found in powdered milk samples were 0.02 mg/kg for DDT and DDE, < 0.01 mg/kg for DDD and α-BHC, 0.01 mg/kg for HCB, β-BHC and lindane and pentachlorobenzene, and 0.16 mg/kg for PCBs.

80-0129. Hermann, R. S.; Schuppler, J.; Ohde, G.; Tennekes, H. (Inst. Toxicol. & Pharmakol., Univ. Marburg, Marburg, BRD) **Liver tumour-promoting agents: their discovery, properties, and potential use in short-term carcinogenicity testing in rats.** *Eur. Soc. Toxicol. Congr.* 21: 6; 1979.

Tests were performed to determine the usefulness of tumor-promoting agents in short-term carcinogenicity testing. Phenobarbital, hexachlorocyclohexane (BHC), synthetic steroid hormone, DDT and dieldrin were tested. Pre-neoplast liver cells were studied using histochemical assays and thymidine autoradiography. These cells are much more suscpetible to mitogenic effects of the compounds tested than are normal liver cells. This test can be used to demonstrate tumor-promoting potential of foreign compounds. A no-tumor-producing level can also be defined. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0130. Warzok, R.; Mendel, J.; Thust, R.; Blaufass, E. M.; Schwarz, H.; Batka, H. (Inst. Pathol., Med. Acad. Erfurt, Erfurt, DDR) **Differences in carcinogenicity and tumor spectrum following transplacental and postnatal application of chemical carcinogens.** *Eur. Soc. Toxicol., Congr.* 21: 12; 1979.

Studies were performed in which rats, hamsters, guinea pigs, rabbits, dogs, and rhesus monkeys were exposed to methyl and ethylnitroso-urea, ethylene and propylene thiourea, procarbazine and metabolites of arylurea herbicides to determine their transplacental and post-natal carcinogenic activity. The authors conclude from these studies that some tumors and congenital growths in humans may result form exposure to chemical compounds. The problems associated with this area of research, including fetus sensitivity, carcinogen activation and localization of tumors, are discussed. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0131. van Logten, M. J.; Beekhof, P.; Vos, J. G. (Natl. Inst. Public Health, Bilthoven, The Netherlands) **Screening pesticides on immunotoxicity.** *Eur. Soc. Toxicol., Congr.* 21: 25; 1979.

Studies were performed to determine quantitative and qualitative effects of chemicals on the immune systems of rats. The animals were exposed to 18 pesticides at

subacute levels. Growth, total and differential leukocyte counts. weight, and histopathology thymus, spleen and lymph nodes, IgG ad IgM were determined. The role of malnutrition of these parameters was also studied. The results varied. Some pesticides caused no, or marginal, effects on immunological parameters. Others caused immunological and general effects, while only sensitive immunological effects were produced by some pesticides. Further studies will be necessary to determine the functional cause and effect relationship. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0132. Sachsse, K.; Zbinden, K.; Ullmann, K. (Exp. Toxicol., Ciba-Geigy Ltd., Stein, Switzerland) **The significance of mode of exposure in inhalation toxicity studies - head only versus whole body exposure.** *Eur. Soc. Toxicol., Congr.* 21: 39; 1979.

Studies were performed to determine the differences in head only and whole body exposures to inhaled hydrophilic and lipophylic pesticides (3 insecticides and 2 herbicides) by rats. The hydrophylic compounds were less toxic upon whole body exposure and the lipophilics were more toxic at whole body exposures. The carbamates were equally toxic in both exposure types. The authors conclude that the type of exposure is a critical consideration in testing for effects of toxicants. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0133. Vergieva, T.; Zaikov, C. (Inst. Hyg. Occup. Health, Med. Acad., Sofia, Bulgaria) **Behavior teratology tests.** *Eur. Soc. Toxicol., Congr.* 21: 54; 1979.

A series of studies using a modification of the Wahlsten 18 test scale were performed to determine postnatal development deviations due to intrauterine exposure to lead acetate, alcohol, styrene and endosan (binapacryl). Physical development and unconditional reflex development were assessed. Progeny CNS function was estimated by open field procedure. Learning ability and memory capacity were assessed by T-maze tests. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0134. Juskiewicz, T. (Dep. Pharmacol. & Toxicol., Vet. Inst., Pulawy, Poland) **Effects of environmental toxicants on embryonic development.** *Eur. Soc. Toxicol., Congr.* 21: 60; 1979.

The importance of studying the embryotoxicity and teratogenicity of compounds is discussed. Mounting evidence shows that air pollutants, toxic metals, PCBs, pesticides, chlorodibenzodioxins, mycotoxins, *N*-nitroso compounds and many others can produce effects on fetuses of animals and humans. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0135. Muller, J.; Haberzettl, R. (HA Biol., Abt. Zool., VEB Fahlberg-List, Magdeburg, DDR) **Mutagenicity of DNOC in *Drosophila melanogaster*.** *Eur. Soc. Toxicol., Congr.* 21: 64; 1979.

Studies were performed on male *Drosophila melanogaster* exposed to oral doses of dinitro- *o*- cresol (DNOC). The frequency of induced sex-linked recessive lethals in pre- and post meiotic germ cells were then determined. The mutagenic actiity of 50-200 ppm DNOC in post meiotic stages was 11 lethals/ 1570 chromosomes. Pre meiotic activity was 3 lethals/ 1001 chromosomes. The rate for all germ cells was 18/3140. The lowest concentration which would induce lethals was 0.25 m*M*. Lethals were induced at a rate of 112/534 chromosomes by 500 ppm dimethyl nitrosamine. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0136. Revazova, J.; Radchenko, L.; Muravnik, G. (Res. Inst. Biol. Testing Chem. Compounds, Moscow, USSR) **Modification of mutagenic activity of anticancer drugs.** *Eur. Soc. Toxicol., Congr.* 21: 71; 1979.

Tests were performed in mammals on the effects of polyvinyl pyrrolidone on the anti-cancer drugs fotrine and fopurine. Reduction in the mutagenic effects of these chemicals by polyvinyl pyrrolidone was demonstrated in dominant lethal tests, sperm abnormality tests and cytogenetic analysis. The reduction of mutagenicity is dose related. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0137. Zdienicka, M.; Zielenska, M.; Tudek, B.; Szymczyk, T. (Dep. Biochem., Warsaw Med. Sch., Warsaw, Poland) **Mutagenicity of thiram in *Salmonella* test system.** *Eur. Soc. Toxicol., Congr.* 21: 73; 1979.

Studies were performed on the effects of thiram on *Salmonella typhimurium* TA 1535, TA100, TA1538 and TA98. Tests were performed with and without activation by liver microsomes. Although the sulfydryl group containing compounds abolished mutagenic activity of thiram in all strains, it induced mutations in TA1535 and TA100 without metabolic activity and in TA1538 and TA98 with metabolic activation. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0138. Knapek, R.; Kita, K. (Inst. Przemyslu Org., Pszczyna, Poland) **The evaluation of carcinogenic effects in a toxicological long-term test.** *Eur. Soc. Toxicol., Congr.* 21: 83; 1979.

Studies were performed on 3 pesticides to determine toxicological effects on rats. Four groups of rats were given various oral doses of chlormequat, bromfenvinphos and carbendazim for 24 months. There were no etiopathogenetic relations between the action of bromfen-

vinphos or chlormquat and tumor formation, but there may be a relationship between tumors and carbendazim. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0139. Tiefenbach, B.; Lange, P. (Inst. Pharmacol. Toxicol., Wilhelm Pieck Univ., Rostock, G. D. R.) **Studies on the action of dimethoate on the immunological system.** *Eur. Soc. Toxicol., Congr.* 21: 97; 1979.

The actions of dimethoate on immune reactions of mice and rats were examined. Leukopenia occurred after 75 mg dimethoate/kg was administered. Lymphocytes decreased by 50% and thymus and spleen wt decreased. After 72 hrs all parameters were normal. Twenty five mg/kg caused a decrease of thymocytes and nucleated cells of bone marrow. The titer of antibodies to SRBC was also diminished. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0140. Desi, I.; Varga, L.; Farkas, I. (State Inst. Hyg., Dep. Toxicol., Budapest, Hungary) **The effect of DDVP, an organophosphoric pesticide, on the humoral and cell-mediated immunity of rabbits.** *Eur. Soc. Toxicol., Congr.* 21: 98; 1979.

In order to examine cell-mediated immunity, oral doses of DDVP (dichlorvos) at rates of 1/40, 1/20 and 1/10 LD50 were administered daily to rabbits. Agglutination titers decreased due to the highest dose after 1 week. The 1/40 dose resulted in a decrease after 6 weeks of administration. The cholinesterase activity decreased with the highest doses only. These studies are appropriate for detecting early and mild adverse effects of low doses of pesticides. The results are discussed from a human point of view. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0141. Golbs, S.; Kuhnert, M.; Fuchs, V. (Dep. Vet. Pharmacol. Toxicol. & Pharm., Karl Marx Univ., Leipzig, G.D.R.) **A proposal concerning the prenatal toxicological testing of chemical compounds in Wistar rats.** *Eur. Soc. Toxicol., Congr.* 21: 110; 1979.

A study is presented in which prenatal toxicological investigations were carried out with carbaryl, parathion and humic acid. Effects were noted by the number of living and dead fetuses, weight of fetuses, and rate of retardation. The authors contend that these types of studies call for positive control groups. Furthermore, the skeletal system should be studied along with the essential liver and kidney parenchyma. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0142. Lewerenz, H. J.; Bleyl, D. W. R. (Cent. Inst. Nutr., Res. Cent. Mol. Biol. & Med., Acad. Sci., Potsdam-Rehbrucke, DDR) **Postnatal effects of single oral administratin of ethylenethiourea to rats during late pregnancy.** *Eur. Soc. Toxicol., Congr.* 21: 113; 1979.

A study was performed to evaluate the effects of ethylenethiourea on survival of offspring of rats given one dose of 1-50 mg/kg on day 17, 18, 19, or 20 of gestation. Doses of 30 and 50 mg/kg significantly increased the number of stillborns. The highest number of dead pups(16 and 46%) occurred when the dose was administered on the 20th day of gestation. Survival was dose-related with doses higher than 10 mg/kg. Hydrocephalus was the cause of most mortality which occurred by the 28th day after birth. 19 rats of the 119 that survived 6 months were hydrocephilic. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0143. Mirkova, E.; Antov, G.; Vasileva, L.; Christeva, V.; Benchev, L. (Inst. Hyg. Occup. Health, Med. Acad., Sofia, Bulgaria) **Study on the teratogenic effect of warfarin in rats.** *Eur. Soc. Toxicol., Congr.* 21: 115; 1979.

Studies were performed on the effects of warfarin on embryogenesis in rats. The compound was administered orally from the 1st to 21st day of gestation at doses of 0.02, 0.01, 0.005, and 0.0025 LD50, and from the 8th to the 14th day at a dose of 0.02 LD50. All but the lowest dose caused severe maternal and fetal toxicity. Teratogenic effects consisted of malformation in the hind limbs, soft tissue abnormalities, and skeletal malformation. In addition there was a dose-dependent increase in abortions, hemorrhages and mortality. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0144. Foss, W.; Krechniak, J. (Dep. Toxicol., Med. Sch., Gdansk, Poland) **The fate of propoxur in rat.** *Eur. Soc. Toxicol., Congr.* 21: 127; 1979.

A series of studies were performed to observe the absorption, distribution and excretion of propoxur in rats. Test animals were given single doses of propoxur, iv, at 5 mg/kg; 2- isopropoxyphenol, iv, 50 mg/kg; and propoxur orally, 50 mg/kg. Levels in tissues, blood and urine were determined by gas chromatography. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0145. Hesse, S.; Wolff, T.; Mezger, M. (Inst. Toxikol. Biochem., Neuherberg/ Munich, BRD) **Involvement of phenolic metabolites in the irreversible protein binding of ^{14}C bromobenzene catalyzed by rat liver microsomes.** *Eur. Soc. Toxicol., Congr.* 21: 130; 1979.

Metabolic studies were carried out on the irreversable binding of bromobenzene and naphthalene. During

the metabolism of ^{14}C bromobenzene and ^{14}C naphthalene, radioactivie material was bound to the microsomal protein. Reactive intermediates appear to be responsible for the binding, due to several observations. The binding continues even though primary metabolism ceased. Binding was not affected by TCPO, but dihydriol formation was blocked. UDP-glucuronic acid largely reduced the amount of free phenols. Reactive metabolites were formed during metabolism. It appears also that phenols, generated from aromatic hydrocarbons, are further metabolized to protein binding species. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0146. Pratt, I. S.; Keeling, P. J.; Smith, L. L. (Cent. Toxicol. Lab., Imperial Chem. Ind. Ltd, Near Macclesfield, Cheshire, England) **The effect of high concentration of oxygen on paraquat and diquat toxicity in rats.** *Eur. Soc. Toxicol., Congr.* 21: 154; 1979.

Studies were performed to determine the effects of high oxygen concentrations on pesticide poisoning. Rats were administered paraquat at 2.5 or 20 mg/kg and diquat at 10 and 20 mg/kg subcutaneously, and exposed to air or to an atmosphere of 85% oxygen. A 10-fold increase in mortality due to paraquat in 85% oxygen was observed. However, only a 2-fold increase in mortality was observed due to diquat exposure in 85% oxygen. Lung damage was seen after 20 mg/kg paraquat in air and oxygen exposure, with type I and II alveolar cells involved. 2.5 mg/kg paraquat and 20 mg/kg diquat resulted in selective damage to type II cells in 85% oxygen, with little change in other cell types. It is concluded that type II cells are the primary targt for paraquat and diquat in the lung. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0147. Wysocka-Paruszewska, B.; Osicka, K. A.; Brzezinski, J.; Gradowsak-Olszewska, I. (Dep. Toxicol. Chem., Med. Acad., Warsaw, Poland) **Studies on combined action in evaluation of pesticide toxicity.** *Eur. Soc. Toxicol., Congr.* 21: 167; 1979.

Studies on the toxicity of combined pesticides were carried out. Thiuram (thiram), combined with pesticides from other chemical groups [carbaryl, Unden (propoxur), Pirimor (pirimicarb), chlorfenvinphos, malathion, and lindane], was evaluated. Effects were additive, less than additive, and more than additive. Potentiation of toxicity was determined according to the ratio of predicted to observed LD50 values. There was no evidence of the similarity of effects of compounds of related chemical structure. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0148. Ivanova-Chemishanska, L.; Antov, G.; Hinkova, L. (Inst. Hyg. Occup. Health, Sofia, Bulgaria) **Changes in the reproduction and generation under the effect of some pesticides.** *Eur. Soc. Toxicol., Congr.* 21: 170; 1979.

Studies were carried out on gonad changes, reproduction, and generation following oral administration of fundasol (carbamate) 1000 mg/kg, balagrin (dinitroanilin formulation) 55 mg/kg, and endodan (dithiocarbamate) 0.038 and 0.0038 mg/kg daily for 4 months. Changes in fertility and generations were studied by consecutive creation of a parental (F_0) generation and 3 new generations (F_1-F_3). The indices of fertility, gestation, viability, and lactation were determined. Different rates of negative effects on reproduction and generation were established by the type and dose of formulation. Recommendations for safety measures were made. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0149. Brzezinski, J.; Wysocka-Paruszewska, B. (Dep. Toxicol. Chem., Inst. Bipharmacy, Med. Acad., Warsaw, Poland) **Neurochemical alterations as a biochemical test for studying the neurotoxic action of phosphoroorganic insecticides in rats.** *Eur. Soc. Toxicol., Congr.* 21: 174; 1979.

A study was performed to examine the response of nervous systems, in terms of blood and tissue CA and AChE activity, in rats during chronic phosphoorganic insecticide toxicity studies. A significant decrease of AChE activity in blood and brain occurs during exposure to the insecticides. The brain and blood content of A and NA were diminished, but urine levels of both amines were elevated. A direct influence of OPI on synthesis and turnover of CA in rats is indicated by studies with disulfiram, an inhibitor of DBH activity. [Abstract presented at the 21st Congr. of the Eur. Soc. Toxicol.]

80-0150. Bainova, A. (Inst. Hyg. & Occup. Health, Sofia. Bulgaria) **A schedule for predicting the dermal irritation effect of chemicals on rats.** *Eur. Soc. Toxicol., Congr.* 21: 177; 1979.

A study was performed to determine a schedule for saftey evaluation of mild and moderate skin irritants on white rats. Repeated 21-day tests are performed with 2-4 different concentrations to measure the degree of irritation. Tests closely duplicate conditions of use and provide data on skin adaptation capacity. Erythema, oedema, scaling, necrosis and alopecia are given fractional scores. The ratio of positive animals to the total "all or none" number is an "all or none" index used in probit analysis. The DI_{50}-dose provoking irritation in 50% of the animals was then determined. Comparing these data with human toxic contact dermatitis data would then allow for prediction of dermal irritation. Thirty six substances were evaluated.

80-0151. Ishikawa, S.; Miyata, M.; Imai, H.; Uga, S.; Oono, S.; Nakano, K.; Chotibutr, S. (Dep. Ophtahlm,

Sch. Med., Kitasato Univ., Sagamihara, Japan) **Ocular manifestations of chronic organophosphate pesticide intoxication (combined toxicity).** *Excerpta Med. Int. Congr. Ser.* 450(1): 207-212; 1979 (5 references).

Miniature swine were given oral doses of 1mg/kg (1 unit) benzene hexachloride (BHC), 1mg/kg (1 unit) DDT, 4 mg/kg (1 unit) fenitrothion, and 2 mg/kg (1 unit) copper oxide. The compounds were fed for 1 yr in various dosage units. Animals receiving the largest dosage (550 units; 10 units 6 days/wk) exhibited clinical signs of oral aphtha (OA), genital ulcers (GU), subcutaneous nodules (SN), pyoderma (PD), and hyperemia of conjuctiva (HC). Autopsy findings demonstrated histopathologic changes typically seen in Bechet's disease. One animal receiving the minimum dosage of 240 total units exhibited OA, SN, and PD. X-ray analyses of the cells demonstrated high peaks of Cu, C1, and P in the skin, mucosa, and digestive organs.

80-0152. Miyata, M.; Imai, H.; Ishikawa, S. (Dep. Ophthalmol., Sch. Med., Kitasato Univ., Sagamihara, Japan) **Experimental retinal pigmentary degeneration by organophosphoruos pesticides in rats.** *Excerpta Med. Int. Congr. Ser.* 450(1): 901-902; 1979 (4 references).

The chronic effects of fenthion on rat retina, and the development of retinal degeneration, were studied. Twenty Long-Evans pigmented rats were injected with 50 mg fenthion/kg body wt twice a week for 1 yr. At the end of 12 mo the average body weights of the pesticide treated animals were 100 g lower than the weights of controls. Retinal function, measured by electro retinography, was reduced at the end of the year. Changes in the fundus appeared gradually; degeneration was most prominent at the posterior pole of the fundus. Histologic changes in the retina included swollen and disorganized pigment epithelium, pyknosis of the inner nuclear layer, and appearance of melanin granules in Muler cells and around vessels. These results indicate that prolonged contact with organophosphorous compounds can contribute to human retinal degeneration.

80-0153. Chandra, D. B.; Agrawal, T.N. (State Inst. Ophthalm., M.D. Eye Hosp., M.L.N. Med. Coll., Allahabad, India) **Optic neuropathy by environmental exposure to organophosphate pesticides.** *Excerpta Med. Int. Congr. Ser.* 450(1):903-905; 1979 (8 references).

Histopathologic changes in the optic nerves of albino rabbits after 2 hr/day for 2 mo exposure to 0.5% parathion sprayed into their cages are described. Optic nerves of 70% of the animals showed an increase in cellularity due to the appearance of mononuclear cells between and around nerve bundles. Immature fibroblasts were more pronounced at the periphery of the nerve.

80-0154. Giri, S. N.; Hollinger, M. A. (Dep. Physiol. Sci., Univ. California, Davis, CA 95616) **The inhibitory effect of paraquat on histamine and isoproterenol induced changes of cyclic nucleotides in rat lung slices.** *Experientia* 35(9): 1219-1220; 1979 (10 references).

The incubation of rat lung slices with paraquat ion (10^{-4} *M*) had no effect on cAMP and cGMP levels of the rat lung slices. The preincubation with the same concentration of paraquat inhibited the cAMP elevating effect of histamine (10^{-5} *M*) and isoproterenol (10^{-5} *M*) and reduced the cGmp level to approximaetly 50% of the level obtained without preincubation with paraquat. (Author abstract by permission)

80-0155. Samojlov, L. N.; Ladonin, V. F. (All-Union Res. Inst. Fertilizers & Agric. Soil Sci., Moscow, USSR) **Effect of herbicides 2,4-D, dicamba and their mixture on some processes of pea nitrogen metabolism.** *Fiziol. Biokhim. Kul't. Rast.* 11(1): 35-39; 1979 (11 references).

In studies on pea plants, it was shown that the mechanism for the effects of the herbicides dicamba and a dicamba 2,4-D mixture is similar to that for 2,4-D alone. Protein metabolism in axis organs is disturbed, and there is inhibition of formation of organic substances and incorporation of fertilizer nitrogen. In addition, distribution of nitrogen frations between plant organs is broken, with predominant accumulation in stems.

80-0156. Antal, M.; Bedo, M.; Constantinovits, G.; Nagy, K.; Szepvolgyi, J. (Inst. Nutr., H-1097 Budapest, Hungary) **Studies on the interaction of methomyl and ethanol in rats.** *Food Cosmet. Toxicol.* 17(4): 333-338; 1979 (14 references).

The effects of feeding methomyl (200 mg/kg diet) and ethanol (10% aqueous solution) both separately and together were studied in R/Amsterdam rats. Response to the combined administration of the two agents produced evidence of some interactions, resulting in a decrease in growth in both male and female rats and an increase in the relative weights of the adrenals. Sex differences were apparent, however, in some of the responses to the combined treatment: only in the male rats were hepatic levels of triglyceride and free fatty acids increased and the cholinesterase activity of the brain decreased to a level significantly below those associated with administration of either agent separately, whereas in the females the relative weight, of the kidneys and the fasting level of blood-glucose were increased. (Author abstract by permission)

80-0157. Cooper, P. (Author address not given) **Getting rid of pentachlorophenol.** *Food Cosmet. Toxicol.* 17(4): 405-406; 1976 (12 references).

Pentachlorophenol (PCP) is an efficient uncoupler

of oxidative phosphorylation in mitchondria, and is capable of disturbing microsomal detoxication mechanisms in the liver. The primary route of excretion of PCP fed to rats has been found to be via the kidneys, and to a lesser extent (10-20%) through the feces. Highest residual concentrations in tissues are usually found in the liver and kidneys, the lowest in the brain, spleen, and fatty tissues. In man, elimination of 0.1 mg PCP/kg body wt doses fed to volunteers were primarily through the urine, either as PCP and/or its glucuronide metabolite. Urinary excretion reached its peak at 42 hr, while plasma PCP concentrations were highest 4 hr after administration.

80-0158. Martson', L. V. (All-Union Sci. Res. Inst. Hyg. & Toxicol. Pestic. Polym. & Plast. Mat., Kiev, USSR) **Testirovanie teratogennoi aktivnosti khlorofosa na zolotistom khomyachke i belykh myshakh. [Teratogenicity testing of chlorophos in golden hamsters and albino mice.]** *Gig. Sanit* 44(7): 70-72; 1979 (5 references) (Russian).

The teratogenic effect of chlorophos (trichlorfon) was studied in golden hamsters and albino mice. The pregnant animals were treated with 300 mg/kg/day doses po on day 8 or between days 7-11 of pregnancy. No teratogenic effects were seen in the albino mice compared with the untreated controls. In the golden hamsters treated between days 7-11, no reduction of fertility and no increase in intrauterine mortality were seen, but there was a significant increase in fetal weight due to compensatory growth. These changes were less marked in the fetuses of mothers treated on day 8 of pregnancy. The incidence of fetal development anomalies in the golden hamsters was 5.92% versus 5.03% in the controls, which indicates very weak teratogenic activity of chlorophos in this species. The anomalies were, however, more serious in the experimental fetuses than in the controls (cleft palate, fused ribs, and phocomelia, versus renal hemorrhage, general edema, and microphthalmos in the controls).

80-0159. Kuz'minskaya, U. A.; Alekhina, S. M.; Bersan, L. V. (All-Union Sci. Res. Inst. Hyg. & Toxicol. Pestic., Polym. & Plast. Mat., Kiev, USSR) **Dinamika izmenenii aktivnosti fermentov krovi pri postuplenii Valeksona v organizm belykh krys. [Dynamic changes in the blood enzyme activities in albino rats following the administration of Valexon.]** *Gig. Sanit.* 44(7): 78-79; 1979 (7 references) (Russian).

The effects of Valexon (phoxim) on the glucose-6-phosphatase (G6P), hexokinase (HK), total cholinesterase (ChE) and ChE isoenzyme activities were studied in the blood of male albino rats weighing 200-250 g. Group 1 served as a control; group 2 was treated (po) with a single 310 mg/kg dose of Valexon (0.5 LD50), group 3 with 31 mg/kg/day for 1-6 mo, and group 4 with 3.1 mg/kg/day for 1-6 mo. In group 3 the G6P and HK activities were increased, and the ChE activity was reduced, 1 hr after treatment. The HK activity normalized 1 hr later, the G6P activity remained elevated, and the ChE activity declined further. All enzyme actiities were normal 5 days after treatment. In group 3, the G6P and G6P dehydrogenase (G6PD) activites were increased by 45% and 70%, respectively, and the total ChE activity was decreased by 45% at the end of the first mo. The ChE fractions 3, 4, and 5 were fully inhibited, fraction 2 was inhibited by 78%, and the activity of fraction 1 was increased by 61%. After the 3 mo treatment, the G6P activity was increased by 89%, the G6PD activity by 42%, and the total ChE activity was inhibited by 26%, while the isoenzyme spectrum did not differ from that in the controls. After poisoning for 6 mo, the G6P and G6PD activities were inhibited by 30%, and the total ChE 24%. Fraction 1 was inhibited by 45%, the activity of fraction 2 increased by 35%, while the fractions 3, 4, and 5 remained normal. The changes seen in group 4 were similar to but less marked than those in group 3.

80-0160. Tsulaya, V. R.; Bonashevskaya, T. I.; Shaipak, V. M.; Zykova, V. V. (A. N. Sysyn Inst. Gen. & Communal Hyg., USSR Acad. Med. Sci., Moscow, USSR) **O kombinorovannom deistvii na organizm nekotorykh khlorproizvodnykh uglevodorodov. [Combined effects of some chlorinated hydrocarbons on the body.]** *Gig. Sanit.* 44(8): 20-22; 1979 (3 references) (Russian).

The effects of various mixtures of chlorinated derivatives of 1,2- dichloropropane (DCP D), 1,2,3-trichloropropane (TCP D), and perchloro ethylene (PCE D) on male albino rats were studied by detrmining changes in the blood cholinesterase and catalase activities and in the summation threshold index (SPP), and the time of onset of these changes. The animals inhaled 6 different mixtures containing the 3 substances at different concentrations (1.5-2,000 mg/m^3 for DCP D, 0.2-800 mg/m^3 for TCP D, and 4.2-2,750 mg/m^3 for PCE D). The changes in the test parameters and the time of onset of these changes under the effect of the different concentrations showed the same type of effect regardless of the concentration and they approached closely the sum of the effects produced by the mixture components when applied separately.

80-0161. Girenko, D. B.; Zlatev, Z. D. (All-Union Sci. Res. Inst. Hyg. & Toxicol. Pesticid. Polym. & Plast. Mat., Kiev, USSR) **Kharakter raspredeleniya mil'beksa i fozalona v organizme teplokrovnykh. [Character of the distribution of milbex and phosalone in the warm-blooded organism.]** *Gig. Sanit.* 44(8): 76-77; 1979 (1 reference) (Russian).

The distribution of milbex and phosalone was studied in the organs of albino rats 15 min to 16 hr after the ig administration of a single 400 mg/kg dose of the mixture of these pesticides (0.2 LD50) by GLC. The pesticides reached the bloodstream in a short time after administration; increasing concentrations of phosalone were found in

the blood and liver between 15-60 min after administration. A sharp decline in the phosalone concentration and a slow decrease in the milbex level were found in the blood and liver after 60 min. The highest concentration of phosalone (5-7 μg/g) was found in the brain and heart 1 hr after administration, while the highest concentration of milbex was found in these organs after 4 hr. The phosalone and milbex levels found after 8-16 hr were several times lower than the respective maximum concentrations. Increasing accumulation of milbex in the fatty tissues was seen. Degradation products of phosalone were not found.

80-0162. Baratov, K. B. (Tadzhik Sci. Res. Inst. Epidemiol. & Hyg., Dushanbe, USSR) **Zavisimost' soderzhaniya nekotorykh mikroelementov v rastitel'nykh produktakh ot primeneniya gerbitsidov v Tadzhikskoy SSR. [Dependence of some trace element levels in vegetable products on the application of herbicides in the Tadzhik SSR.]** *Gig. Sanit.* 44(8): 77-78; 1979 (Russian).

The effects of herbicide treatment on Fe, Al, Mn, Ni, Ti, Cu, and Mo levels in vegetables were studied by emission spectral analysis. Carrots grown in soil treated with 1 and 1.5 kg/ha prometryne contained 11-22% more Fe than did the controls. The Fe content was decreased by 22% at a prometryne dose of 2 kg/ha. At a dose of 1 kg/ha the Al level was increased by 38%, and decreased with increasing doses. Green peppers were analyzed 64 days after treatment with prometryne (1 and 1.5 kg/ha). After treatment with 1 kg/ha the Fe level was reduced by 44%, the Ti level by 40%, and the Cu and Mo levels also decreased significantly and progressively with increasing prometryne doses. The Mn and Al levels showed no significant changes. The prometryne levels in the peppers were within the acceptable limits. Tomatoes, analyzed 110 days after treatment with 1 kg/ha prometryne, accumulated less Al (by 59%) than did the controls. The Al level dropped by 84% as the dose was increased to 1.5 kg/ha. Similar changes were seen in the Al levels in the tomatoes treated with kretazin. The Fe, Ni, and Mn levels showed no significant changes. The Fe and Mn levels showed no change in eggplants under the effect of prometryne, but the Cu level dropped by 30% at 1 kg/ha and by 60% at 1.5 kg/ha. Eggplants treated with kretazin accumulated less Fe and Mn than did the controls. The treated eggplants contained no Cu, while the Cu level was 10 μg in the control samples. The findings indicate that herbicide treatment causes major changes in the trace element levels in vegetables.

80-0163. Wright, F. C.; Riner, J. C.; Haufler, M.; Palmer, J. S.; Younger, R. L. (USDA, Kerrville, TX) **Toxicity and residual aspects of alkylmercury fungicides in livestock.** *Hazard Toxic Subst.* 2(1): 331-355; 1979 (16 references).

Various species of animals were dosed with mercurial fungicides. Signs of poisoning included lack of appetite, loss of weight, muscular incoordination, unstable gait, and lameness. Rapid accumulation of mercury from the fungicides was noted in all species tested. In the blood of cattle and sheep the levels of mercury were inconsisent. The kidney contained the greatest mercury residues in cattle and sheep with lower levels in the liver, muscle and brain. In the chickens and turkeys the greatest concentration was in the liver, followed by the kidney and muscle, when treated with low doses. At higher dose levels the greatest concentration was present in the kidney with lesser amounts in the liver and muscle. Mercury was present for a long period of time in the hair of livestock.

80-0164. Grula, J. W.; Taylor, O. R., Jr. (Dep. Syst. & Ecol., Univ. Kansas, Lawrence, KS 66045) **The inheritance of pheromone production in the sulphur butterflies *Colias eurytheme* and *C. philodice*.** *Heredity* 42(3): 359-371; 1979 (27 references).

Gas chromatographic analyses of wing extracts demonstrated an ultraviolet reflectance pattern which is controlled by an X-linked gene. This reflectance is used as a marker to determine the relative influence of this chromosome v. the autosomes on phermone production. The production of the most important *C. philodice* n-hexyl esters in the wings is controlled by one or more autosomal genes that are at least codominant. A discussion is offered of the evolution of X chromosomal control of both visual and olfactory components of the pheromone system.

80-0165. Takahashi, M.; Horikoshi, T.; Chiba, M.; Yoshida, Y.; Hakozaki, K.; Kamimura, M.; Fuse, M. (Sch. Dermatol., Sapporo Med. Coll., Sapporo, Hokkaido, Japan) **[Therapeutic experiences on scabies by γ-BHC ointment.]** *Hifu-Rinsho (J. Clin. Dermatol.)* 21(11): 965-968; 1979 (14 references) (Japanese).

Fifty-nine cases of scabies treated by γ-BHC (lindane) ointment were summarized. Treatment was conspicously effective (disapperaance of exanthema and itching) in 44 cases, effective (conspicuous improvement of exanthema and itching) in 15 cases, and without effectiveness in no cases. The patients were diagnosed by the detection of *Sacroptes scabiei* var *hominis* or its eggs, or by immunotesting. The treatment of exanthema was performed for 3 to 5 consecutive days, and the effectiveness was observed daily for 2 wk. It was proposed that (1) the active ingredient should by as pure as possible, (2) application should be in the form of ointment, (3) time period of administration should be as short as possible, and (4) intake of ointment by children should be avoided.

80-0166. Sachan, G. C.; Manchanda, S. K. (Dep. Entomol., Coll. Agric., G. B. Plant Univ. Agric. & Technol., Pantnagar, Nainital, India) **Studies on the action of some**

systemic insecticides on sugarcane. *Indian Sugar* 29(3): 153-156; 1979 (11 references).

The effects of organophosphorous and carbamate insecticides on germination and root and shoot development of the sugarcane were investigated. Furadan 3 G (carbofuran), fensulfothion 10 G, mephosfolan 5 G, and phorate 10 G were applied at rates of 0.5, 1.0, and 2.0 kg AI/ha; BHC (lindane) was applied at 1 kg AI/ha only. Application of the pesticides did not enhance the germination rate of the cane at 4, 6, and 8 wk after planting. Significant differences in the performance of the pesticides on number of roots per plant were observed only after 8 wk. Maximum root weight gains (0.93 gm) after 4 wk occurred with the 1 kg furadan/ha treatment, followed by phorate, fensulfothion, and mephosfolan, each at 0.5 kg/ha. All treatment regimens were superior to controls or lindane in root weight gains or shoot length after 8 wk.

80-0167. Kaminsky, L. S.; Fasco, M. J.; Guengerich, F. P. (Div. of Lab. & Res., N.Y. State Dep. Health, Albany, NY 12201) **Comparison of different forms of liver, kidney, and lung microsomal cytochrome P-450 by immunological inhibition of regio- and stereoselective metabolism of warfarin.** *J. Biol. Chem.* 254(19): 9657-9662; 1979 (48 references).

The cytochrome P-450 of liver, lung, and kidney microsomes of rats exposed to the inductive effects of phenobarbital (PB) or 3-methylcholanthrene (MC) were incubated with R- or S- sodium warfarin. The regioselectiveky, stereoselectivity of warfarin metabolism, and the inhibition of this by rabbit antibodies (IgG) against cytochrome P-450 were studied. The greatest metabolic conversion of warfarin took place in liver microsomes; this activity was enhanced by PB induction of the rat liver as well as kidney microsomal P-450 cyctochrome. PB induction of lung cytochrome P-450 did not affect warfarin metabolism.

80-0168. Rozee, K.; Lee, S.; Crocker, J. (Microbiol. Pediatr., Dalhousie Univ., Halifax, Nova Scotia, Canada) **Reduced interferon response mediated by emulsifiers: polyoxyethylene ethers (Toximul MP8).** *J. Clin. Hematol. Oncol.* 9(4): 277; 1979.

A study is reported in which the possible mechanism for increased susceptibility of mice treated with polyoxyethylene ether polymers to virus infections is presented. The interferon (INF) system is thought to be compromised. The effect appears to occur intracellularly. Treated cells show both a delay in INF production and a reduction in the amount produced. It is suggested that polyoxyethylene ether polymers, the emulsifiers which are popular components of insecticides, may contribute to the etiology of some viral diseases.

80-0169. Khera, K. S.; Whalen, C.; Trivett, G.; Angers, G. (Bur. Chem. Saf., New Res. Cent., Ottawa, Ontario K1A OL2, Canada) **Teratologic assessment of maleic hydrazide and daminozide, and formulations of ethoxyquin, thiabendazole and naled in rats.** *J. Environ. Sci. Health B* 14(6): 563-577; 1979 (29 references).

Female Wistar rats were exposed to test doses of the following compounds and strengths: maleic hydrazide (400, 800, 1200, or 1600 mg/kg); daminozide (300, 600 or 1000 mg/kg); ethoxyquin or thiabendazole (125, 250, 500 mg/kg); or naled (25, 50, or 100 mg/kg). Administration was once daily by esophageal intubation from days 6 to 15 of gestation. No adverse effect on maternal body weight during pregnancy was noted. The number of pregnant rats in any group was not related to the treatment. The only finding of weight differences was a significantly reduced fetal weight in those whose mothers had been exposed at the 125 mg/kg level of thiabendazole. The 1200 mg/kg dose of maleic hydrazide reduced the number of live fetuses. Total implants per pregancy were reduced at the 100 mg/kg level of naled. Resorption was increased at the 125 mg/kg level of ethoxyquin and also at the 125 mg/kg level of thiabendazole.

80-0170. Goldsmith, L. A.; Carlson, G. P. (Dep. Pharmacol. & Toxicol., Coll. Pharm., Univ. Rhode Island, Kingston, RI 02881) **Divergent toxicity of parathion in two freshwater invertebrates, *Orconectes rusticus* and *Viviparus malleatus*.** *J. Environ. Sci. Health B* 14(5): 579-588; 1979 (14 references).

Crayfish and snails were exposed in distilled water to various amounts of parathion or paraoxon. The snail was very resistant to parathion with a level of 100 ppm not causing any toxic effects. Even after an injection of approximately 250 mg/kg parathion no deaths were observed and no toxic signs noted during a 96 hr observation period. The crayfish were extremely sensitive to parathion with a 1.0 ppb level causing death in all crayfish within a 24 hr period. At 0.1 ppb levels death still occurred, but it was delayed. Snails were resistant to paraoxon while the crayfish were extremely sensitive.

80-0171. Sundaram, K. M. S.; Szeto, S. Y. (For. Pest Manage. Inst., Canadian For. Serv., Dep. Environ., Sault Ste. Marie, Ontario P6A 5M7, Canada) **A study on the lethal toxicity of aminocarb to freshwater crayfish and its *in vivo* metabolism.** *J. Environ. Sci. Health B* 14(6): 589-602; 1979 (10 references).

Adult crayfish were exposed in river water to aminocarb at concentrations of 0.1, 1.0, 10.0, 25.0, 30.0, 40.0, 50.0 and 60.0 ppm. Levels up to 5.0 ppm did not appear to cause any behavioral changes in the crayfish. Acute toxicity symptoms were apparent at concentrations greater than 10 ppm. Mortality occurred above 25 ppm.

80-0172. Baldock, J. D.; Frank, P. R.; Graham, P. P.; Ivey, F. J. (Dep. Food Sci. & Technol., Virginia Polytech. Inst. & State Univ., Blacksburg, VA 24061) **Potassium sorbate as a fungistatic agent in country ham processing.** *J. Food Prot.* 42(10): 780-783; 1979 (17 references).

Potassium sorbate was applied to 60, 70, and 90 day old country cured hams as a fungistatic agent during the aging process by spraying a 5% (w/v) concentration for 1 min. At this rate of application the mold and yeast colony count at 30 days were significantly lower than they had been initially. However, protection was lost by the 60th day when the hams were stored under conditions which are conductive to the growth of these fungi. Use of a 10% concentration under similar conditions provided greater protection. The residue from the chemical was under the limits approved by the FDA.

80-0173. Ward, J. M.; Bernal, E.; Buratto, B.; Goodman, D. G.; Strandberg, J. D.; Schueler, R. (Carcinog. Test. Program, Div. Cancer Cause & Prev., NCI, Bethesda, MD 20014) **Histopathology of neoplastic and nonneoplastic hepatic lesions in mice fed diets containing tetrachlorvinphos.** *J. Natl. Cancer Inst.* 63(1): 111-118; 1979 (25 references).

In a histopathological study, male and female B6C3F$_1$ mice were fed diets containing tetrachlorvinphos (TCV), at levels of 8000 or 16000 ppm for 80 wk. Survivors were sacrificed at 92 weeks, and all mice were completely necropsied. Treated mice showed a high incidence or unusual non-neoplastic hepatic lesions, characterized by pericellular fibrosis, hepatocyte nuclear pleomorphism, and intrasinusoidal foci of macrophages with intracytoplasmic crystalline structures. Hepatocellular neoplasms occurred in 84-94% of treated males and 21-23% of treated females, compared to 17% of control males and 7% of control females. Neoplasms in TCV-treated mice were histologically different from those in control mice. Liver tumors in control mice were generally composed of small basophilic hepatocytes, while those in treated mice were hepatocelllar carcinomas composed of solid sheets of large basophilic or eosinophilic hepatocytes.

80-0174. Zadikoff, C. M. (Dep. Neurol., Sch. Med., Indiana Univ., Indianapolis, IN 46223) **Toxic encephalopathy associated with use of insect repellent.** *J. Pediatr.* 95(1): 140-142; 1979 (3 references).

Two cases are described of toxic encephalopathy following exposure to *N,N*-diethyl toluamide (deet), which is used in many commercially available insect repellants. In the first case, a 5-yr-old girl was sprayed nightly with a repellant containing 10% DET for 3 mo. Her symptoms included slurred speech, convulsions, extreme agitation, and constant involuntary movements. The child died 24 days after admission, and at autopsy the brain showed generalized edema with intense congestion of brain and meninges, and swelling of endothelial cells in cerebral blood vessels. In the second case, an 18-mo-old child ingested an unknown amount of liquid repellent containing deet. She displayed extreme irritability and bizarre movements, but her condition improved steadily. The author suggests that these reactions are rare and do not warrent special precautions in the use or insect repellants at this time.

80-0175. Pritchard, J. B.; James, R. O. (Lab. Pharmacol., NIEHS, Research Triangle Park, NC) **Determnants of the renal handling of 2,4-dichloro phenoxyacetic acid by winter flounder.** *J. Pharmacol. Exp. Ther.* 208(2): 280-286; 1979 (42 references).

Winter flounder were used to study the factors which govern renal handling of 2,4-D. Incubation of isolated flounder tubules with 2,4-D caused extensive energy dependent accumulation of this herbicide. Other known substrates of the organic acid system inhibited uptake in a dose-dependent manner. *In vivo* studies showed that the clearance of 2,4-D was 620 ml/kg/hr. The study demonstrated that winter flounder allows secretory transport of 2,4-D via the organic anion system both *in vitro* and *in vivo*.

80-0176. Koschier, F. J.; Acara, M. (Dep. Physiol., Sch. Med., State Univ. New York, Buffalo, NY) **Transport of 2,4,5-trichloro phenoxyacetate in the isolated, perfused rat kidney.** *J. Pharmacol. Exp. Ther.* 208(2): 287-293; 1979 (33 references).

Isolated perfused kidneys from male Spraque-Dawley rats were exposed to 2,4,5-T. The binding of 2,4,5-T to BSA was extensive. The clearance of the herbicide was a fraction of the glomerular filtration rate. The results of this study allow the conclusion that 2,4,5-T can undergo net tubular secretion even though the herbicide was bound to plasma proteins extensively. The 2,4,5-T/PAH clearance ratio was less than unity during experiments performed in a dextram perfusate. Thus 2,4,5-T can reduce normal renal function and thereby limit its own excretion.

80-0177. Vachkova-Petrova, R. (Inst. Hyg. & Occup. Dis., Med. Acad., Sofia, Bulgaria) **Mutagenna aktivnost na pestitsidite. [Mutagenic activity of pesticides.]** *Khig. Zdraveopaz.* 21(5): 496-506; 1978 (75 references) (Bulgarian).

Studies on the mutagenicity of pesticides in plants, *Drosophilia*, mammalian cell cultures, human cell cultures, and human lymphocytes are reiewed. Dichlorovos, 2,4,5-T, CMK, ceresan M, and ferbam were found to be mutagenic in the *Drosophilia* test. Diazinon, dimethoate, dichlorvos, malathion, methyl parathion, trichlorfon, DDT and its isomers, polychlorocamphene (toxaphene), lindane, 2,4-D, 2,4,5-T, zineb, and ziram were found to be mutagenic in human cell cultures and/or lymphocytes.

80-0178. Lebedev, V. V.; Petrushov, A. Z. (All Union Res. Inst. Phytopathol., Moscow, USSR) **Toksichnost' pestitsidov dlya imago Enkarzii. [Toxicity of pesticides for imago on *Encarsia*.]** *Khim. Sel'sk. Khoz.* 17(5): 36-38; 1979 (8 references) (Russian).

In an attempt to test whether *Encarsia formosa* can be used in combination with pesticides for the protection of green-house plants from whitefly, the initial and residual toxicity of 10 pesticides for the imago of *Encarsia* was determined. Parasites were kept in the ponds sprayed with pesticides. In experiments on the evaluation of residual toxicity, *Encarsia* were placed in the pond 1 hr, 1, 3, 5, 10, 15, 20, 25 and 30 days after spraying with pesticide (0.1%, AI). It was found that the most toxic for *Encarsia* was Actellic (pyrimiphos-methyl): the death rate after spraying with 0.0001-0.0005% was 25-94.5%. Carbophos (malathion) at 0.00025% and 0.00025% provided the death of 2-89% of *Encarsia*. Rogor (dimethoate) at 0.0001-0.0005% caused the death of 21.1-94.4% of *Encarsia*. The least toxic for *Encarnsia* was the organophosphorus pesticide Orten. According to the degree of initial toxicity, the pesticides could be divided into highly toxic (LC50 < 0.001%, AI: Actellic > carbophos > Rogor > Pyrimor), toxic (LC50 0.001-0.01%: Orten > Acrex (dinobuton), > Tedion (tetradifon), and mildly toxic (LC50 > 0.01%: Benlate (benomyl) > Kelthane (dicofol) > Carathan). The duration of residual toxicity ranged from 25-30 days for Actellic, Carbophos, Rogor, Orten Pyrimor, and Acrex, to 5 days for Tedion, 10 days for Kelthane and Carathan, and 24 hr for Benlate.

80-0179. Zuza, V. S. (All Union Res. Inst. Soil Prot. Against Erosion, USSR) **Minimal'naya obrabotka pochvy (analiticheskii obzor). [Minimal soil cultivation (literature review).]** *Khim. Sel'sk. Khoz.* 17(5): 41-44; 1979 (78 references) (Russian).

Literature data pertaining to the efficacy of minimal soil cultivation are reviewed. It was shown that no till cropping practices increase the weediness of the crop with perennial dicotyledonous weeds. The system of soil cultivation not only changes the species composition of weeds, but also affects the effectiveness of herbicides. It was found that toxicity of herbicides for weeds is directly related to the density of soil.

80-0180. Levchenko, E. A.; Didenko, L. N. (All-Union Sel. Genet. Inst., USSR) **Toksichnost' insetitsidov dlia vreditelei zernovykh zapasov. [Toxicity of insecticides for grain storage pests.]** *Khim. Sel'sk. Khoz.* 17(6): 19-21; 1979 (6 references) (Russian).

The contact toxicity of 13 organophosphorus insecticides was determined for a series of Coleoptera pests of grain storage. Weevils, meal beetles, and flour beetles were sprayed with aqueous emulsions of insecticides at a rate of 35 ml/cm². The lethality for pests was estimated 48 hr after the spraying. It was found that the most toxic insecticides for all test pests were Cyanox (cyanophos; LD50 of 0.0014-0.003%), Actellic (pirimiphos- methyl; 0.0001-0.002%), Valexon (phoxim; 0.00014-0.0023%), Baitex (0.00008-0.0031%), Diazinon (0.0011-0.016%), and Heterophos (0.002-0.014%); Phosalone, Ethaphos, Orten and Dipterophos were midely toxic (the value of LD50 ranged from 0.0021% to 0.018%), while chlorophos was ineffective against storage pests (LD50 of 0.025-0.45%).

80-0181. Roslavtseva, S. A. (All-Union Res. Inst. Chem. Means Plant Prot., Moscow, USSR) **Rezistentnost' tlei k pestitsidam (analiticheskii obzor). [Resistance of aphids to pesticides (literature review).]** *Khim. Sel'sk. Khoz.* 17(6): 26-30; 1979 (60 references) (Russian).

Literature pertaining to the development of resistance to pesticides in various species of Aphidae is reviewed. The first case of resistance to organophosphorous insecticides was recorded in *Chromaphis junlandicola*: the 2-yr use of parathion resulted in significant increase of the level of resistance. Resistance to various insecticides was detected in 17 species of aphid: in 10 species the resistances hindered control measures. It is emphasized that in order to prevent formation of resistance variants and rotation of insecticides should be tested and employed. To prevent development of cross resistance insecticides of different chemical structure should be used in the rotation.

80-0182. Hetzel, D.; Birkett, D.; Miners, J. (Dep. Med., R. Adelaide Hosp., Adelaide 5000, South Australia) **Cimetidine interaction with warfarin.** *Lancet* 2(8143): 639; 1979 (4 references).

A case report is presented in which the effects of the anticoagulant warfarin are enhanced by cimetadine. A 45 yr old woman exhibited epigastric pain and nausa following treatment of asthma with prednisolone. Two ulcers were present on the duodenal cap. She had been undergoing warfarin treatment for two years following heart valve replacement. Her prothrombin ratio (PTR) was 1.5. 1000 mg/day cimetidine resulted in a PTR of 2.1. She was eventually placed on a dosage of 800 mg/day and her PTR rose to 3.0. The author concludes that patients on anti coaguants should be closely monitored if cimetidine is introduced.

80-0183. Carter, S. A. (Dep. Physiol. Med., Univ. Manitoba, Winnipeg, Canada) **Potential effect of sulindac on response of prothrombin time to oral anti-coagulants.** *Lancet* 2(8144): 698-699; 1979 (2 references).

A case report is presented in which a 72-yr-old man was administered sulinac, an anti-inflammatory analgesic agent. A marked prolongation of the prothrombin time and decreased requirement for oral anticoagulant (war-

farin) followed. At the time of sulinac treatment (200 mg twice a day) his prothrombin time was between 18 and 21 sec, and his warfarin dose was 5 and 10 mg on alternate days. After 3 weeks, prothrombin time was 26 sec and warfarin was reduced to 4.25 mg daily. Prothrombin time eventually stabilized at 30 sec. There is a strong suggestion that sulindac potentiates the action of warfarin.

80-0184. Borzsonyi, M.; Pinter, A. (Natl. Public Health Inst., Budapest, Hungary) **Daganatkelto N-nitrozo vegyletek keletkezese *in vivo* es az emberi kornyezetben. [Formation of carcinogenic N-nitroso compounds *in vivo* and in the human envirionment.]** *Magy. Onkol.* 23(3): 171-179; 1979 (76 references) (Hungarian).

Studies on the formation of carcinogenic N-nitroso compounds *in vivo* and in the human environment are reviewed. The formation of carcinogenic compounds was observed after the *in vitro* nitrosation of such pesticides as carbaryl, propoxur, Hopcide (CPMC), Baygon (propoxur), carbofuran, benlate (benomyl), carbendazim, dodin, benzthiazuron, fenuron, ferbam, thiram, ziram, phenylcarbazide, semicarbazide, alar (daminozide), atrazine, simazine, and triforin. The carcinogens formed were *N*-nitroso carbaryl, *N*nitroso propoxur, *N*nitroso hopicide, *N*niroso baygon, *N*nitroso carbofuran, *N*-nitroso carbendazim, methyl nitrosourea, *N*-nitroso benzthiazuron, DMNA, DEMA, *N*-nitroso triazine, and 1,4-dinitroso piperazine. Phenylcarbazide and semicarbazide are intrinscially carcinogenic.

80-0185. Surovtseva, E. G.; Funtikova, N. S. (Inst. Microbiol., Acad. Sci. USSR, Moscow, USSR) **Cometabolism of 3,4- dichloroaniline by representatives of the genus *Pseudomonas*.** *Microbiology (USSR)* 47(1): 14-17; 1978 (12 references).

In two strains of *Pseudomonas aurantiaca*, 1 and 7, an ability to transform 3,4- dichloroaniline under conditions of cometabolism was detected. It was noted that there is an apparent relation between the level of total oxidase activity and the ability to transform 3,4- dichloroaniline. The various representatives of the genus *Pseudomonas* which were used in this study have a low peroxidase activity. [*Microbiology (USSR)* is the English translation of *Mikrobiologiya*]

80-0186. Schoeny, R. S.; Smith, C. C.; Loper, J. C. (Kettering Lab., Dep. Environ. Health, Univ. Cincinnati Med. Coll. Cincinnati, OH 45267) **Non- mutagenicity for Salmonella of the chlorinated hydrocarbons Aroclor 1254, 1,2,4- trichlorobenzene, mirex and kepone.** *Mutat. Res.* 68(2): 125-132; 1979 (30 references).

A polychlorinated biphenyl mixture, Aroclor 1254, two commercial grade insecticides, mirex and Kepone (chlorodecone), and a pesticide breakdown product, 1,2,4-trichloro benzene were evaluated for mutagenicity and hepatic enzyme induction potential in the Salmonella/microsomal assay. None was found to revert strains TA1535, TA1537, TA98 or TA100 when tested with or without metabolic activation. Liver microsomal extracts (S9) from rats induced with 1,2,4- trichloro benzene were shown to differ from S9 of either control or Aroclor 1254-induced rats in the capicity to activate 2- aminoanthracene mutagenesis. (Author abstract by permission)

80-0187. Lee, I. P.; Suziki, K. (Lab. Environ. Toxicol., Natl. Inst. Environ. Health Sci., Research Triangle Park, NC 27709) **Induction of unscheduled DNA synthesis in mouse germ cells following 1,2- dibromo-3- chloropropane (DBCP) exposure.** *Mutat. Res.* 68(2): 169-173; 1979 (19 references).

Acute toxicity studies of 1,2- dibromo-3-chloropropane (DBCP) in mice demonstrated that the respective LD50 values for prepubertal and adult male mice were 180.7 mg/kg (154.0-197.5 mg/kg body wt) and 123 mg/kg (100.5-141.5 mg/kg body wt) which were significantly different. The slopes of the dose-response curves (1.2) were steep and essentially the same, indicating a narrow margin of safety. A single maximally tolerated dose of DBCP (100 mg/kg) administered intra peritoneally to prepubertal male mice induced significant unscheduled DNA synthesis in the premeiotic germ cells but not in spermatozoa. (Author abstract by permission)

80-0188. Anonymous **Die Chemie von Methylquecksilber. Bericht. [Chemistry of methylmercury. A report.]** *Naturwiss. Rundsch.* 32(9): 371-373; 1979 (German).

The chemistry and biochemistry of methylmercury are reviewed. Ingested methylmercury is resorbed rapidly from the human gastro intestinal tract into the blood. It is bound to the Sh groups in the red blood cells and in the plasma, probably in the form of CH_3HgCl, which is formed in the stomach. The hemato encephalic barrier is cleared only by methylmercury bound to serum albumin. In the brain methylmercury causes cytolysis. Methylmercury undergoes bio transformation to Hg(II) in the liver, and part of the merthylmercury returns with the bile into the gastrointestinal tract. The excretion is therefore relatively slow (2%/day in the feces and about 0.1%/day in the urine). The biological half-life of methylmercury is 70 days in the human body. The poisoning symptoms are paresthesia, ataxia, dysarthria, loss of hearing, blindness, coma, and death. The antidotes are complexing agents such as dimercapto succinic acid and N-acetyl-D, L-penicillamine.

80-0189. Renner, G. (Pharmakol. Inst., Univ. Munchen, D-8000 Munchen 2, BRD) **Metabolic studies on pen-**

tachloro nitrobenzene (PCNB) and tests of the joint action of PCNB and mercuric chloride given to rats. *Naunyn Schmiedebergs Arch. Pharmacol.* 308(Suppl): R50; 1979.

Studies were performed to determine the toxicity of pentachloro nitrobenzene (PCNB; quintozene) and mercury, alone and in combination, on rats. At lower concentrations the effect was more than additive, and effects were additive at other concentrations. Metabolites in feces were identified by GC-EC, and urinary metabolites were isolated by means of TLC and identified by spectra.

80-0190. Koss, G.; Seubert, S.; Seubert, A.; Kraus, P.; Koransky, W.; Ippen, H. (Inst. Toxikol. & Pharmakol., D-3550 Marburg, BRD) **The effect of mercury in the hexachloro benzene treated female rat.** *Naunyn Schmiedebergs Arch. Pharmacol.* 308(Suppl): R50; 1979.

Studies were performed in which the effects of hexachloro benzene (HCB) on glutathione transferring enzymes in porphyria were studied. When the glutathione content of the liver of HCB-treated rats is reduced by diethyl maleate porphyria occurs earlier, and there is more of a disturbance to porphyrin metabolism than with HCB alone. With HCB-treated rats dosed with mercury there is a higher accumulation of porphyrins in the liver than in the liver of rats treated with HCB alone. HCB metabolites were observed bound to liver cytosol proteins.

80-0191. Brigelius, R.; Hegner, D. (Inst. Pharmakol., FB Tiermedizin Univ., D-8000 Munchen 22, BRD) **Paraquat induced lipid peroxidation in isolated perfused rat liver.** *Naunyn Schmiedebergs Arch. Pharmacol.* 308(Suppl): R51; 1979.

A study was performed to determine the effects of paraquat on lipids of rat livers. After 24 hours of starvation rats were sacrificed and the livers perfused with 1mM paraquat. There was an increase in O_2 consumption, a 3.5-fold increase in GSSG-release, a decrease in phospholipid content, an increase in absorption at 235 nm in both mitochondria and microsome fractions, and a small change in the ratio of unsaturated and saturated fatty acids. It is concluded that lipid peroxidation in mitochondria and microsomes is induced by paraquat.

80-0192. Steffen, C.; Rottwilm, B. (Inst. Pharmakol. Toxikol., Univ. Marburg, Lahnberg, D-3550 Marburg, BRD) **Influence of paraquat on microsomal lipid peroxidation in different experimental systems.** *Naunyn Schmiedebergs Arch. Pharmacol.* 308(Suppl): R51; 1979.

Experiments were performed in which the influence of paraquat on microsomal lipid peroxidation (LPO) was observed. Mouse liver microsomes exhibit a high NADH dependent LPO. Paraquat inhibits LPO (Ki = 60μM) when Sorensen buffer is used. However, when Tris buffer is used paraquat stimulates LPO. The buffer effect was eliminated by using isolated hepatocytes in Krebs-Henselest buffer with 1 mM paraquat. LPO was inhibited by paraquat and menadione. According to those results LPO is not responsible for paraquat toxicity.

80-0193. Leyck, S.; Freundt, K. J. (Inst. Pharmacol. Toxicol., Fac. Clin. Med. Mannheim, Univ. Heidelberg, D-6800 Mennheim, BRD) **Kinetics of ^{14}C palmitic acid incorporation into microsomal and mitochondrial phospholipids and thiram(T) induced alteration of microsomal fatty acid (FA) pattern.** *Naunyn Schmiedelbergs Arch. Pharmacol.* 308(Suppl): R52; 1979.

Studies were performed to determine the kinetics of palmitic acid incorporation by lipids of wistar rats. Extracorporeally perfused livers exposed to ^{14}C palmitic acid showed maximal incorporation of radioactivity by microsomal phospholipids after 1 hr. The highest activity was found in LPC, followed by PC, PE, PI, SM and PS. After 2 hrs maximal activity was in mitchondrial phospholipids, with the highest activity being in PC and decreasing in order of PE, LPC, PS, SM and PI. Pretreatment with 30 mg/kg thiram(T) altered incorporation rates. It is concluded that even low levels of T appear to alter the microsome membranes, explaining previously reported effects of T on microsomal activity.

80-0194. NCI, Bethesda, MD **Bioassay of fenthion for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 103: 1-104; 1979 (21 references).

No appreciable toxicity was noted in male and female F344 rats and female B6C3F1 mice given fenthion. However, fighting was noted among male mice at a higher incidence level than among non-treated mice. Rats and mice from all groups were at risk for late developing tumors. Interstitial cell tumors of the testis occurred in male rats at incidences related to the dose levels. Female rats and mice did not experience increases in the numbers of tumors found over the control animals. Sarcomas, fibrosarcomas, or rhabdomysarcomas of the integumentary system occurred in male mice at incidence rates related to the dose levels. The increase of these tumors in the male B6C3F1 mice suggests that the test chemical was carcinogenic in these animals. However, it was concluded that under the conditions of this bioassay fenthion did not act as a carcinogen for male or female F344 rats or female B6C3F1 mice.

80-0195. NCI, Bethesda, MD **Bioassay of 2,7-dichloro dibenzo-*p*- dioxin (DCDD) for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 123: 1-103; 1979 (20 references).

Osborne-Mendel rats and B6C3F1 mice were dosed with DCDD (a contaminant of 2,4,5-T, 2,4-D and PCP

pesticides) with the result that the mean body weights of the male rats and both sexes of mice were lower than contols. Survival, however, was not affected significantly in any group. No significant increases were noted in tumor incidence among male or female rats nor in female mice. Increases were noted in the male mice in hepatocellular adenomas or carcinomas. However, it is stated that the increase in hepatocellular adenomas or carcinomas is not clearly related to the administration of DCDD. A significant increase in leukemias or lymphomas occurred in the male mice. It was concluded that DCDD was not carcinogenic for Osborne-Mendel rats of either sex or for female B6C3F1 under the conditions of this study.

80-0196. NCI, Bethesda, MD **Bioassay of 2,4,6-trichlorophenol for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 155: 1-115; 1979 (21 references).

Male and female F344 (Fischer) rats and B6C3F1 mice were given feed containing 2,4,6-trichlorophenol. Dosed rats and mice of each sex experienced lower mean body weights than controls. Lymphomas or leukemias occurred in a dose dependent manner among male rats. Monocytic leukemia did not occur at significant levels among female rats. Dosed female rats did exhibit leukocytosis and monocytosis of the peripheral blood and hyperplasia of the bone marrow that was not seen in the control animals. Hepatocellular carcinoma occurred at an incidence which was dose related in both male and female mice. Thus it was concluded that 2,4,6-trichlorophenol is carcinogenic in male F344 rats and both sexes of B6C3F1 mice under the conditions of this bioassay.

80-0197. NCI, Bethesda, MD **Bioassay of *p,p'*-ethyl-DDD for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 1156: 1-15; 1979 (25 references).

Rats and mice exposed to 2 different concentrations of *p,p'*-ethyl- DDD (TDE) experienced a weight loss. This may have been due to the unpalatable diets rather than a direct effect of the chemical. No evidence of increased tumor occurrence was noted among male and female rats and among male mice. Hepatocellular carcinomas or adenomas did occur at incidences which were dose related in the female mice. Therefore it was concluded that *p,p'*-ethyl- DDD was not carcinogenic for male or female F344 rats or for male B6C3F1 mice under the conditions of this bioassay. The findings do suggest a carcinogenic effect in female mice.

80-0198. NCI, Bethesda, MD **Bioassay of phthalic anhydride for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 159: 1-107; 1979 (23 references).

The carcinogenicity of phthalic anhydride, a reagent used in the synthesis of the agricultural fungicide phaltan (folpet), was studied. Subchronic and chronic studies were done with male and female F344 rats and B6C3F1 mice. Animals were given feed containing low or high doses of phthalic anhydride. Mean body weights of some groups were lower than those of the corresponding control groups, however, survival of the study animals was not affected by the phthalic anhydride. No adenomas or tumors in the dosed groups could be clearly related to administration of the test chemical. It was concluded that under the conditions of this bioassay phthalic anhydride did not act as a carcinogen for the animals studied.

80-0199. NCI, Bethesda, MD **Bioassay of calcium cyanamide for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 163: 1-112; 1979 (19 references).

The carcinogenicity of the herbicide and soil insecticide calcium cyanamide was studied. Subchronic and chronic dose studies were done with male and female F344 rats and B6C3F1 mice. Animals were given the compound in their feed. Mean body weight of most a groups were lower than those of the corresponding control groups, however, mortality was dose related only in the male mice. Survival was 70% or greater in all dosed and control groups. In subchronic studies on rats dose related follicular hyperplasia of the thyroid was found to be caused by calcium cyanamide. In chronic studies on rats no neoplasms could be clearly related to the administration of calcium cyanamide. In chronic studies hemangiosarcomas, lymphomas, or leukemias could not be related to administration of the test chemical in mice. It was concluded that under the conditions of this bioassay calcium cyanamide did not act as a carcinogen for the animals studied.

80-0200. Takamiya, T.; Uchida, A. (Inst. Rural Med., Chiba Univ., Chiba, Japan) **[Condensation of DDT in cultured yellowtail.]** *Nippon Noson Igakkai Zasshi (Jpn. J. Rural Med.)* 28(3): 484-485; 1979 (Japanese).

Residues of DDT-derivatives, *p,p'*-DDE, *p,p'*-DDT, *o,p'*-DDT, *p,p'*-DDT, and Σ-DDT were determined and compared between natural and cultured yellowtails as well as between young and adult fish. The actual values of the compounds found were, respectively, in young natural fish; 4.4, 6.2, 2.1, 1.3 and 14: in adult natural fish; 20, 22, 7.8, 8.6, and 59: in young cultured fish; 9.7, 22.4, 4.8, 9.0 and 46: and in adult cultured fish; 31, 33, 4.6, 29 and 99 ppb. It was found that the increase of DDT-content with growth was parallel to the increase of lipid in fish regardless of the environment. However, the rate of increase was slightly larger under natural conditions.

80-0201. Glickman, A. H.; Hamid, A.; Lech, J. J. (Dep. Pharmacol. & Toxicol., Med. Coll. Wisconsin, Mil-

waukee, WI 53226) **Uptake, elimination and metabolism of permethrin in rainbow trout.** *Pharmacologist* 21(3): 168; 1979.

The high toxicity of permethrin to fish was studied in metabolism experiments on the rainbow trout. ^{14}C *cis* and *trans* permethrin was found to be readily taken up and eliminated, with elimination half-lives for ^{14}C from tissues ranging from 14 hr for blood to 36 hr for liver. Thin layer chromatography was carried out on bile extracts, showing that nearly all ^{14}C-derived permethrin was in the form of a glucuronide conjugate. An intact ester, perhaps 4-HO-permethrin, was the predominant biliary meabolite. It is thought that the bile contains few or nohydrolytic products of the *cis* and *trans* permethrin ester.

80-0202. Ortiz de Montellano, P. R.; Kunze, K. L. (Dep. Pharm. Chem., Sch. Pharm., Univ. California, San Francisco, CA 94143) **Inactivation of cytochrome P-450 by insecticide synergists. Covalent binding of aryl acetylenes to prosthetic heme.** *Pharmacologist* 21(3): 171; 1979.

In studies using hepatic microsomes from phenobarbital treated rats, incubation with insecticide synergists phenyl propargyl ether, 2,4-dichlorophenyl propargyl ether, 4-nitrophenyl propargyl ether, and the related hydrocarbons 4-phenyl-butyne and 3-phenyl-propnye resulted in rapid NADPH-dependent loss of cytochrome P-450. After methylation and purification, the hepatic pigments which accumulated showed mass spectrometric molecular ions due to summation of the given synergist plus the dimethyl ester of protoporphyrin IX (from the prosthetic heme) plus 16 (oxygen atom). Cytochrome P-450 is inactivated by aryl acetylene which covalently binds with prosthetic heme, and this is proposed as a mechanism for the synergistic action of these substances.

80-0203. Koschier, F. J.; Pritchard, J. B. (Mt. Desert Island Biol. Lab., Salisbury Cove, ME 04672) **Excretion of 2,4-dichlorophenoxy acetate (2,4-D) by the dogfish shark (*Squalus acanthias*).** *Pharmacologist* 21(3): 184; 1979.

In vivo renal clearance procedures are used to determine whether 2,4-dichlorophenoxy acetate (2,4-D) administered at a concentration of 2.5 μmol/kg undergoes renal tubular secretion in the dogfish shark. The renal clearance of total 2,4-D is 3000 μl/min/kg, while the glomerular filtration rate (GFR) is 50 μl/min/kg. Treatment with 25 mol bromocresol green/kg decreases the clearance of total 2,4-D/GFR from 60 to 45, indicating that a general decrease in renal function is produced by bromocresol green. Since the urine contains primarily the taurine conjugate of 2,4-D (95%) and the plasma contains mainly 2,4-D, it is thought that 2,4-D is transported into the renal tubular cell, where it is conjugated with taurine before urine elimination.

80-0204. Waddell, W. J.; Marlowe, C.; Maling, H. M. (Dep. Pharmacol. & Toxicol., Sch. Med., Univ. Louisville, Louisville, KY 40232) **Paraquat disposition in mice by whole-body and cellular autoradiography.** *Pharmacologist* 21(3): 212; 1979.

In order to study paraquat disposition male C57Bl/6J mice were injected iv with (methyl-^{14}C) paraquat chloride and frozen 1, 3, 9, and 24 hr after treatment for whole body autoradiogrphy. For cellular autoradiography other mice were injected intravenously with (methyl-^{3}H) paraquat chloride and lungs were removed at 3, 24, and 48 hr. Since these methods do not involve thawing or exposure to solvent, translocation or removal of radioactivity is prevented. The whole body autoradiographs showed that at all time intervals radioactivity was localized in melanin, lung, muscle, and excretory pathways (proximal tubules of kidney, urine, liver, gall bladder and intestinal contents). With cellular resolution autoradiogrphy radioactivity was shown to be confined almost entirely to alveolar type II cells.

80-0205. Brundin, A.; Anders, M. W. (Dep. Pharmacol., Univ. Minnesota, Minneapolis, MN 55455) **Glutahion-dependent reductive dehalogenation of 2,2′,4′-trichloro acetophenone (TCAP) to 2′,4′-dichloro acetophenone (DCAP).** *Pharmacologist* 21(3): 215; 1979.

A study on the metabolism of α-haloketones, which have been identified as metabolites of the pesticide chlorfenvinphos, were carried out. The conversion of the α-haloketone 2,2′,4′-dichloro acetophenone (TCAP) to 2′,4′-dichloro acetophene (DCAP) was investigated, with DCAP being measured by GC/MS. TCAP was found to be metabolized to DCAP by hepatic cytosolic enzymes, with glutathione required for maximum activity. With protein concentration up to 5.6 mg/ml, the reaction was linear with time for 20 min. While no distinct pH optimum was observed, the temperature optimum was 45°C.

80-0206. Parker, W. B.; Saito, K.; Gardner, D. E.; Menzel, D. B. (Dep. Pharmacol., Med. Cent., Duke Univ. Durham, NC 27710) **Disruption of type II pneumocyte phospholipid metabolism by paraquat.** *Pharmacologist* 21(3): 218; 1979.

In studies using cultured human lung carcinoma cells (A-549) of type II origin paraquat was shown to be highly toxic. After incubation with paraquat at 10^{-3} *M* concentrations for 24 hr only 51.2% of the cells were viable. The incorporation and excretion of phospholipids, as measured by incorporation of 1-^{14}C-palmitate, into the medium was stimulated by paraquat. There was a 51% increase in lecithin and a 5.3-fold increase in phosphatidyl ethanolamine, along with a 33% decrease in incorporation of palmitate into neutral lipids. Peroxidation of unsaturated lipids and changes in intracellular phospholipid and neutral lipid content also occurred. It is suggested that

paraquat acts directly on phospholipid synthesis and excretion in the lung.

80-0207. Saito, K.; Parker, W. B.; Gardner, D. E.; Menzel, D. B. (Dep. Pharmacol., Med. Cent., Duke Univ. Durham, NC 27710) **Paraquat accumulation by cultured lung cells.** *Pharmacologist* 21(3): 218; 1979.

In order to determine whether type II pneumocytes are responsible for paraquat and diquat accumulation in the lung, three cell lines were incubated with various media and inhibitors, and paraquat uptake was assayed. Of the ions tested Ca^{++} was found to be the most potent inhibitor of paraquat uptake (62-64% at 10 m*M*), but K^+ and Na^+ were also inhibitory. Norepinephrine (10^{-3} *M*) and 5-hydroxytryptamin (10^{-3} *M*) were slightly inhibitory, while 10^{-3} *M* putrescine, diquat, and ouabain were not inhibitory. Paraquat uptake was stimulated to 165% with 10^{-5} *M* valinomycin and to 158% with iodoacetate. It is suggested from these data that type II cells are not likely to be the major cell type responsible for the paraquat accumulation seen in mixed cell preparations.

80-0208. Chu, I.; Villenueve, D. C.; Becking, G. C.; Viau, A. (Environ. Health Dir., Health Prot. Branch, Ottawa, Ontario K1A OL2, Canada) **Tissue distribution and metabolic excretin of 2,8-dihydromirex in the rat.** *Pharmacologist* 21(3): 236; 1979.

The pharmacokinetic behavior of 2,8-dihydromirex, a dechlorinated derivative of mirex, was studied in the rat. Following intravenous and oral administration 2,8-dihydromirex was found in all tissues, with the highest concentrations in fat, liver and skin. After an intravenous dose fecal excretion was represented by a biphasic curve, and elimination from the blood by a quadraphasic exponential curve. Excretion occurred exclusively in the feces, and 2,8-dihydromirex made up 89-100% of the total radioactivity in the tissues and feces. There were no detectable metabolites. The pharmacokinetic behavior of 2,8-dihydromirex is apparently similar to that of photomirex and mirex.

80-0209. James, M. O. (NIEHS, NIH, St. Augustine, FL 32084) **Disposition of 2,4-D, 2,4,5-T, DDA and phenylacetic acid in the spiny lobster (*Panulirus argus*).** *Pharmacologist* 21(3): 251; 1979.

The extent of metabolism and urinary excretion of 2,4-dichloro phenoxyacetic acid (2,4-D), 2,4,5-trichlorophenoxy acetic acid (2,4,5-T), bis- (4-chlorophenyl) acetic acid (DDA), and phenylacetic acid (PAA) were compared in the spiny lobster. ^{14}C-labeled acid was injected into the pericardial sinus. Animals were sacrified at various times from 2 hr to 3 wk after treatment, and the tissue distribution of ^{14}C was determined. While all acids were taken up from the hemolymph into the green gland and the hepatopancreas, 2,4-D and 2,4,5-T were preferentially taken up into the green gland and excreted unchanged with a t 0.5 of 8 hr. PAA was preferentially taken up by the hepatopancreas, metabolized and excreted with a t 0.5 of 1 wk. DDA was excreted at an intermediate rate. It is suggested that the acid taken up by the green gland is excreted rapidly in urine as unmetabolized parent compound, while the acid taken up by the hepatopancreas is metabolized and excreted as feces.

80-0210. Winne, D. (Abt. Molekularpharmakol., Pharmakol. Inst., Univ., Tubingen, D-7400 Tubingen, BDR) **Influence of blood flow on intestinal absorption of drugs and nutrients.** *Pharmacol. Ther. A.* 6(2): 333-393; 1979 (339 references).

In this review article an attempt to explain various experimental results on the influence of blood flow on intestinal absorption by a simple model with several modifications is made. Methods for determining absorption rate and blood flow rate are described, and data from studies employing the various methods are presented in tabular form. The dependence of venous appearance, luminal disappearance, serosal appearance, and luminal appearance on blood flow are discussed. Among the substances considered is *p,p′*-DDT, and it is noted that in rats administered 1.8 μmol DDT/kg in 5 ml/kg water or 10-15% ethanol into the duodenum, 19.9% of the *p,p′*-DDT is recovered from lymph 24 hr after dosing. The derivation of equations describing the dependence of intestinal absorption on blood flow is described, and predictions are made based on the model.

80-0211. Benes, V. (Inst. Hyg. & Epidemiol., Prague, Czechoslovakia) **Toxicological aspects of the water we drink.** *Proc. Int. Congr. Toxicol.* 1: 35-45; 1979 (60 references).

The establishment of limits for pesticides in drinking water is considered. Two examples are given which demonstrate an approach to previously established limits. In the USSR the maximum permissible concentration of DDT in drinking water is 0.1 mg/l. This content would be 66% of the ADI for DDT, leaving an allowance of only only 34% to come from food, which is the major source of DDT residues. The permissible level for aldrin in the USA is 0.017 mg/l. If the ADI for aldrin residues is 0.001 mg/kg, intake from water alone would exceed the maximum ADI. Actually, at the time when DDT and aldrin were in use, intake was much lower than the established limits. A satisfactory approach to the problem is the example of the limit for cyanide of 0.05 mg/kg (WHO, 1971). The ADI for cyanide is 0.05 mg/kg. With this approach the calculated intake from drinking water would be only about 3% of the stated ADI. It is suggested that, when properly calculated, ADI values may be useful in considering possible risk from pesticide residues in drinking water.

80-0212. Hess, R.; Thomann, P.; Krinke, G. (Res. Dep., Pharm. Div., Ciba-Geigy Ltd., Basle, Switzerland) **The assessment of neurotoxicity in laboratory animals.** *Proc. Int. Congr. Toxicol.* 1: 245-268; 1978 (79 references).

Experiments on laboratory animals are described which allow the researcher to distinguish between specific neurotoxic effects of substances and indirect effects which arise from metabolic situations produced by systemic toxicity. In many species a peripheral distally accentuated axonopathy is produced by neurotoxins. By acknowledging such situations as cause and effect relationships the introduction of effective protective measures is possible. Examples of neurotoxicity in experimental aniamls caused by organophosphorus esters, aliphatic hydrocarbons, and nitrofurans are given.

80-0213. Johannasen, F. R.; Levinskas, G. J.; Wright, P. L.; Gordon, D. E. (Monsanto Co., St. Louis, MO) **Toxicological evaluation of Avadex and Avadex BW herbicides.** *Proc. Int. Congr. Toxicol.* 1: 441; 1978.

Rats were fed diets containing 50, 100, or 200 ppm di-allate (active ingredient in Avadex) or triallate (active ingredient in Avadex BW) for 24 mo. No effects which could be related to this treatment were noted among the following parameters: hematology, clinical chemistry, urinalysis, absolute organ weights, weight ratios between organs, or gross pathology. The survival rate, the number of animals which developed tumors, or the number of tumors which developed showed no change between treated and non-treated animals. In studies on the teratogenic nature of these chemicals, pregnant rabbits were given orally 3 or 10 mg/kg of di-allate or triallate with no teratogenic response being noted. The dominant lethal test for mutagenic potential showed no elevation in mutagenic response over controls. Studies on the effects of these chemicals on reproduction are in progress.

80-0214. McCormack, K. M.; Gibson, J. E. (Dep. Pharmacol., Michigan State Univ., East Lansing, MI) **The renal handling of paraquat during development.** *Proc. Int. Congr. Toxicol.* 1: 442; 1978.

Renal cortical slices from Sprague-Dawley rats of different ages were exposed to paraquat. Findings of the study suggest that paraquat significantly reduced the accumulation of *N*-methyl nicotinamide in renal cortical slices from all age rats, except those which were 3 days old. Paraquat clearance was similar between 21 day old rats and adult rats. Thus paraquat is apparently secreted by the organic cation transport system. In tissue from 21 day old rats the paraquat was accumulated to a greater extent than at any other age, including adult. It is suggested that, since this herbicide is excreted exclusively by the kidney, the toxicity of paraquat may be age-dependent.

80-0215. Smith, L. L.; Rose, M. S. (Biochem. Mech. Sect., Cent. Toxicol. Lab., Imp. Chem. Ind. Ltd., Alderley Park, Cheshire, England) **The effect of low oxygen therapy on paraquat toxicty in rats.** *Proc. Int. Congr. Toxicol.* 1: 443; 1978.

Rats received an approximate LD100 dose of paraquat (680 μmol/kg) orally and were subsequently placed in an atmosphere of 10% oxygen and 90% nitrogen, or were left in ambient air. Those placed in the 10% oxygen died sooner than those left in air, and there was no reduction in overall mortality. Rats dosed subcutaneously with 105 μgmol/kg paraquat showed similar results. After each type of exposure paraquat accumulated rapidly in the lungs of rats, more rapidly for those in the 10% oxygen environment. Paraquat concentrations in the plasma were not significantly different in the groups of rats. The use of low-oxygen therapy in cases of human poisoning is brought into question by these findings and is contraindicated unless it can be demonstrated that the concentration of paraquat in the circulating blood of the patient is below 0.05 nmol/ml so that enhanced lung accumulation will not occur.

80-0216. Blanc, F.; Warnet, J. M.; Claude, J. R.; Truhaut, R. (Lab. Toxicol., Fac. Sci. Pharm. & Biol., Univ. R. Descartes, Paris, France) **Pesticides - "hard" contaminants of human and animal food: aramite as an illustration.** *Proc. Int. Congr. Toxicol.* 1: 444; 1978.

Male Wistar rats were given aramite over a 56 wk period at the level of 400 mg/kg/day in their diets. Aramite was completely transformed and excreted in the urine. All of the animals demonstrated a powerful carcinogenic effect of this chemical on the liver. Malignant proliferation of the hepatic tissue was noted, and in some cases the biliary ducts were also affected apparently without other localization.

80-0217. Gupta, P. K. (Ind. Toxicol. Res. Cent., Lucknow, India) **Toxicity of endosulfan: effect on pentobarbital-induced hypnosis in rats.** *Proc. Int. Congr. Toxicol.* 1: 445; 1978.

Albino rats were orally given endosulfan in peanut oil for 7 or 15 days at concentrations of 0, 1.0, 2.5, and 5.0 mg/kg. Male rats were almost twice as resistant to the toxic effects of endosulfan as were female rats. Liver weights were significantly increased. No change was noted in small intestine, kidney, heart, spleen, brain, gonadal and adrenal weights. No histopathological abnormality was noted in the organs studied, with the exception of the liver, which demonstrated moderate dilation of sinusoids around the central veins. Sleeping time induced by pentobarbital at 50 mg/kg was reduced in endosulfan exposed rats. A probable stimulation of the hepatic microsomal enzyme system is concluded from these findings.

80-0218. Bal, H. S.; Mungkornkarn, P. (Coll. Vet. Med., Iowa State Univ., Ames, Iowa) **Chronic toxicity effects of methoxychlor on the reproductive system of the rat.** *Proc. Int. Congr. Toxicol.* 1: 446-447; 1978.

Male rats were dosed with methoxychlor at 200 mg/kg levels in corn oil and 100 mg/kg in gum tragacanth suspension for a 70 day period. Female rats were dosed at 200 mg/kg in corn oil and 100 mg/kg in gum tragacanth suspension for 14 days before mating and continuously after mating. Studies made subsequent to mating between the rats indicated that methoxychlor had interfered with the normal reproduction in these rats, even at the lower dose levels of 100 mg/kg.

80-0219. Vijay, H. M.; Mendoza, C. E.; Lavergne, G. (Health Prot. Branch, Natl. Health & Welfare, Ottawa, Ontario, Canada) **Production of reaginine (IgE) antibodies to malathion in rats and mice.** *Proc. Int. Congr. Toxicol.* 1: 455; 1978.

Outbred Wistar rats and B62DF1 mice were immunized by giving each a single ip injection of malathion anhydride coupled to bovine serum albumin at various doses mixed with aluminum hydroxide gel. Reaginic antibodies were produced by the mice and rats 11 days after immunization. These antibodies were specific to malathion. Ten days later the antibodies were undetectable. No detectable response of reaginic antibodies was obtained when tested against native bovine serum albumin. The possible use of this technique in detecting reaginic antibodies in the sera of patients allergic to malathion is suggested.

80-0220. Desi, I.; Farkas, I. (Dep. Toxicol., State Inst. Hyg., Budapest, Hungary) **Toxicological control of pesticides from environmental hygienic point of view in Hungary.** *Prod. Int. Congr. Toxicol.* 1: 456; 1978.

A method for achieving toxicological control of pesticides before their introduction into the environment is presented. First the LD50 value of the pesticides is determined with rats. Neurotoxicological investigations are also performed, including examination of the spontaneous and provoked electric activity of the brain and the muscle, learning, and behavioral tests. The immune system is also studied for any possible effects. Thus early adverse effects due to contamination are uncovered, while other general laboratory and clinical tests may still show negative results. The number of pesticide applications per year is followed very closely and data are kept on the persistence, adverse effects on wildlife, effects on sensitive aquatic organisms, and possible harmful effects on living waters. Tissue culture and enzyme studies are also performed.

80-0221. Brown, J. R.; Chai, F. A.; Chow, L. Y.; Stopps, G. J. (Dep. Prev. Med. & Biostat., Fac. Med., Univ. Toronto, Toronto, Ontario, Canada) **Parathion poisoning in an agricultural community.** *Proc. Int. Congr. Toxicol.* 1: 457; 1978.

Cholinesterase inhibition was studied in a population from an area where the use of organophosphate pesticicdes is significant (Holland March, 30 miles north of Toronto, Canada). Farmers who spray parathion throughout the growing season, people living within the designated area but not involved in spraying, packers of produce which has been sprayed, children residents of the marsh, and two control groups were studied for acetylcholinesterase inhibition in plasma. Approximately 11 tons/yr of parathion are applied over the whole marsh area. Tests on farmers at the beginning of the growing season yielded significantly higher cholinesterase concentrations than samples taken from the same people during the height of the growing season. School children had significantly higher levels of cholinesterase than did farmers and produce packers. Low values among farmers were apparently due to greenhouse exposure and inadequate protective clothing.

80-0222. Wooder, M. F.; Wright, A. S.; Stevenson, D. W. (Shell Toxicol. Lab., Sittingbourne Res. Cent., Shell Res. Ltd., Sittingbourne, Kent, England) **Studies on the *in vivo* reactivity of methylating agents for mammalian DNA in relation to the assessment of genetic risk.** *Proc. Int. Congr. Toxicol.* 1: 505; 1978.

Male CFE rats were exposed to dichlorvos in the atmosphere for a 12 hr period. No methylation at the N7 atom of guanine moieties of DNA was noted in subsequent analyses performed on DNA from the total soft tissues. The finding of methylated purines in the urine of the animals does not constitute evidence for the spontaneous methylation of the purine moieties of nucleosides or nucleic acids by methylating agents *in vivo* in light of this research.

80-0223. Glickman, A. H.; Statham, C. N.; Lech, J. J. (Dep. Pharmacol., Med. Coll. Wisconsin, Milwaukee, WI) **Uptake and disposition of pentachlorophenol and pentachloranisole in rainbow trout.** *Proc. Int. Congr. Toxicol.* 1: 547; 1978.

Rainbow trout exposed to pentachlorophenol (PCP) and pentachloroanisol (PCA) exhibited rapid uptake of the chemicals at 0.02 mg/l concentrations in water. The liver, blood, fat, and muscle contained 16, 6.5, 6.0, and 1.0 μg/g, respectively, of PCP after an exposure period of 24 hr. PCA contents were similar, except that fat contained as much as 80 μg/g. Elimination rates for the two chemicals were different. PCA was the more persistent of the two. PCP studies indicated no methylation of the compound in any of the tissues sampled. Bile from PCP-exposed trout contained high concentrations of PCP as the glucuronide conjugate, but no other metabolites. Bile from PCA-exposed trout contained PCP glucuronide as well as

PCA. Some demethylation of PCA is thought to occur in the liver.

80-0224. Hamada, N.; Peterson, R. E. (Sch. Pharm., Univ. Wisconsin, Madison, WI) **Reversal of 2,3,7,8-tetrachloro dibenzo- *p*- dioxin- induced depression in biliary excretion of ouabain by pregnenolone- 16α- carbonitrile and spironolactone in rats.** *Proc. Int. Cong. Toxicol.* 1: 548-549; 1978.

A study to determine if microsomal enzyme inducers would reverse the depressed billary excretion of ouabain in TCDD-treated rats was made. Male Holtzman rats were treated with either 50 mg/kg phenobarbital (PB), 20 mg/kg 3-methylcholanthrene (3MC), 75 mg/kg spiromolacetone (S), or 75 mg/kg PCN 6,7,8, or 9 days after po administration of 10-25 μg/kg TCDD. Ten days after TCDD administration 0.5 mg/kg ouabain was administered iv. S or PCN completely reversed the TCDD-induced depression in the biliary excretion of ouabain on days 6-9. PB or 3MC treatment on days 6-9 tended to enhance the depressent effect of TCDD.

80-0225. Cohen, S. D. (Sch. Pharm., Univ. Connecticut, Storrs, CT) **Organophosphate toxicity and interactions in northern grass frogs (*Rana pipiens*).** *Proc. Int. Congr. Toxicol.* 1:593-594; 1978 (9 references).

150 concentrations of malaoxon were determined in homogenized brains from control adult male CD-1 mice and adult male northern grass frogs. Frog brain cholinesterase was more resistant than mouse brain ChE to malaoxon inhibition. When brains from control and TOTP (tri-*o*-cresy phosphate)-treated frogs were incubated with selected malaoxon concentrations, identical malaoxon inhibition was noted. The results of these studies indicate that malaoxon was more toxic to frogs than to mice, in contrast to malathion. Factors other than lack of target enzyme sensitivity are apparently involved in the resistance of frogs to anti-ChE action of malathion.

80-0226. Schmitt, S. L.; Autor, A. P. (Toxicol. Cent., Dep. Pharmacol., Univ. Iowa, Iowa City, IA) **Effect of paraquat on alveolar macrophages and type II pneumocytes isolated from rat lungs.** *Proc. Int. Congr. Toxicol.* 1: 595-596; 1978.

Alveolar macrophages and type II pneumocytes were isolated from the excised lungs of adult male rats, and subsequently exposed to paraquat. Alveolar macrophages demonstrated a time-dependent decrease in viability in the presence of 1 m*M* paraquat. When incubation had lasted about 1 hr, 83% of the cells remained viable. When superoxide dismutatse was present at 100 μg/ml throughout the incubation, no effect was noted on paraquat lethality after 60 min of exposure. A marked decrease in viability was noted in type II pneumocytes in the presence of both 0.1 m*M* and 1 m*M* paraquat. This was a concentration-dependent effect. The findings suggest that type II pneumocytes are more susceptible to paraquat toxicity than alveolar macrophages.

80-0227. Olorunsogo, O. O.; Bababunmi, E. A.; Bassir, O. (Dep. Biochem., Univ. Ibadan, Ibadan, Nigeria) **Toxicity of glyphosate.** *Proc. Int. Congr. Toxicol.* 1: 597; 1978.

Rats and mice were given oral and ip administrations of to glyphosphate. Severe stress, enhanced breathing, elevated rectal temperature, and occasional asphyxial convulsions were the symptoms noted after exposure. Oral median lethal doses of 4704 mg/kg for the rat and 1581 mg/kg for the mouse were significantly higher than the values of 235 and 130 mg/kg, respectively, obtained, when the herbicide was administered ip. Hyperemia in the lungs was the major lesion noted in glyphosate-poisoned anials. Reduced acceptor contol ratios, enhanced adenosine triphosphatase activity, and a stimulation of the rate of oxygen uptake were noted in mitochondria isolated from the livers of rats at 5 hr after a single ip dosing with 15, 30, 60, and 120 mg/kg. An uncoupling of oxidative phosphorylation in animal mitochondria is suggested as a primary lesion in glyphosphate toxicity.

80-0228. Abou-Donia, M. B. (Dep. Physiol. & Pharmacol., Med. Cent., Duke Univ., Durham, NC) **Neurotoxicity produced by long-term low-level percutaneous administration of leptophos.** *Proc. Int. Congr. Toxicol.* 1: 599; 1978.

Groups of laying hens received pc doses of 0.1, 0.5, 1.0, 2.5, 5.0, 10.0 and 20.0 mg/kg leptophos in acetone for 183, 245, 325, 323 days. Ataxia developed in all hens receiving 0.5, 1.0, 2.5, 10.0 and 20.0 mg/kg after 103, 74-103, 63-92, 49-63, and 49-92 days, respectively. Severity of the condition depended on the size of the daily dermally applied dose. Intoxicated birds demonstrated degeneration of myelin and axons in the spinal cords and sciatic nerves. Treated birds demonstrated an inhibition of plasma cholinesterase. An increase was noted in plasma acid phosphatase.

80-0229. Kisielinski, T.; Galecka, E.; Szymanska, T. (Mil. Inst. Hyg. & Epidemiol., Warsaw, Poland) **Antilethal effect of atropine sulphate, oximes and valium in experimental propoxur(unden) intoxication in mouse.** *Proc. Int. Congr. Toxicol.* 1: 629; 1978.

White female Swiss mice were exposed sc to propoxur. Various drugs, such as atropine sulfate (10 mg/kg), toxogonin (40 mg/kg), toxogonin analogue P-52 (40 mg/kg), and valium (5 mg/kg), were injected 5 min before

the pesticide. The LD50 level of propoxur was increased, with atropine sulfate having the greatest effect. Toxogonin and P-52 decreased the prophylactic action of atropine sulfate. The addition of oximes to atropine sulfate diminished the effect of atropine sulfate about 4 to 5 times. The use of oximes with atropine sulfate in propoxur intoxication is not indicated as helpful. The use of valium with atropine sulfate showed no effect.

80-0230. El-hawari, A. M.; Plaa, G. L. (Dep. Pharmacol., Fac. Med., Univ. Montreal, Montreal, Quebec, Canada) **Changes in the composition and function of the hepatic endoplasmic reticulum after α-naphthyl isothiocyanate: its role in hepatotoxicity.** *Proc. Int. Congr. Toxicol.* 1: 639-640; 1978.

Male Sprague-Dawley rats treated with ANIT (α-naphthyl isothiocyanate) at 150 mg/kg, ip, with subsequent elevations of the AlAT at 2 hr, and 5′-N and bilirubin at 18 hr. Albumin content and the prothrombin time were not changed. Aniline hydroxylase inhibition was noted at 2 hr in the 10,000 *g* supernatant, but only at 12 hr in the 105,000 *g* pellet. Rabbits treated with ANIT (150 or 300 mg/kg, ip) demonstrated reductions in the microsomal metabolizing activity and in P-450. These and other findings suggest that the metabolic lesion observed after ANIT is primary and did not result from accumulation of bile within the hepatocyte. It is suggested that this lesion is of no significance in the pathogenesis of ANIT cholestasis.

80-0231. Stanley, P. I.; Bunyan, P. J. (Pest Infestation Control Lab., Minist. Agric. Fish. & Food, Tolworth, Surbiton KT6 7NF, England) **Hazards to wintering geese and other wildlife from the use of dieldrin, chlorfenvinphos and carbophenothion as wheat seed treatments.** *Proc. R. Soc. Lond. Ser. B* 205(1158): 31-45; 1979 (56 references).

A summary is presented of studies on the dangers to wildlife of wheat seeds treated with dieldrin, chlorfenvinphos, and carbophenothion to combat wheat bulb fly. Dieldrin, which was introduced as a cereal seed treatment in the 1950s, was withdrawn from use in the United Kingdom in 1975 due to the deaths of large numbers of granivorous birds and the contamination of predatory species, and to the residues found in meat and vegetables. In 1973, 28 of the 100 wildlife incidents investigated were attributed to dieldrin, while in 1977 none of the 171 investigated incidents were due to dieldrin. Chlorfenvinphos and carbophenothion, organophosphorous insecticides which are less persistent than dieldrin, were substituted. Both of these compounds have shown species variation in toxicity. Carbophenothion has been withdrawn from use in Scotland due to deaths of wintering geese; *Anser* geese have been shown to be particlarly susceptible. A discussion is presented of the problem of species variation in toxicity when registering chemicals for seed treatment use.

80-0232. Moraes, I. O.; Chaib, M. A. (Food Eng. Fac., Campinas State Univ., Sao Paulo, Brazil) **Bioassay for microbial insecticide.** *Process Biochem.* 13(10): 23-24; 1978 (8 references).

Production of a microbial insecticide with *Bacillus thuringienis* ATCC 13367 was developed. The best conditions for the mass production of the bacteria with 13 culture media, varying glucose concentrations and nitrogen sources, were tested. Dissolved oxygen rate and pH were important parameters in establishing growth and production phase of the bacteria. Lethal concentrations for lepidopterous insects were found to be 0.725% (g/g insect food substrate).

80-0233. Brooks, G. T. (Unit Invertebr. Chem. Physiol., Agric. Res. Counc., Univ. Sussex, Brighton, Sussex, England) **The metabolism of xenobiotics in insects.** *Prog. Drug. Res.* 3: 151-214; 1979 (290 references).

The historical development of insect metabolism studies is given. The present state of knowledge of insect metabolic processes is presented. Discussion of insect microsomes and cytochrome P-450 includes sections on the biochemical aspects, interaction with xenobiotics, and the development of induction and resistance. The discussion of non-oxidative metabolism and conjugation includes hydrolytic conversions, reductive conversions, desaturation, and conjugations. The improvement of selectivity and biodegradability of insecticides through the application of insect metabolism studies is presented. The insect mechanisms of detoxification of organophosphate, carbamate, pyrethroid, and organochlorine insecticides are considered and related to the design of selective insecticides. A discussion of insect metabolism as it relates to environmental problems and the environmental complex as a whole is also included.

80-0234. Hutson, D. H. (Shell Toxicol. Lab., Sittingbourne Res. Cent., Sittingbourne, Kent, England) **The metabolic fate of synthetic pyrethroid insecticides in mammals.** *Prog. Drug. Res.* 3: 215-252; 1979 (71 references).

The metabolic fate of synthetic pyrethroids in mammals and its relevance to their toxicology is presented. A review of the work on the subject published prior to November 1977 is made. The development and nomenclature of synthetic pyrethroids is covered. A summary is made of the metabolic fate of natural pyrethrins. The metabolism of various synthetic pyrethroids (allethrins, tetramethrin, resmethrin, bioresmethrin, cismethrin, ethanomethrins, kadethrin, proparthrin, prothrin, benzyl esters, dimethrin, barthrin, phenothrin, permethrin, cyanobenzyl esters, α-cyano- 3-phenoxybenzyl tetramethyl cyclopropane carboxylate, cypermethrin, decamethrin, and fenvalerate) is discussed. A summary of pyrethroid metabolism studies made in species other than rats (cows, goats, dogs, guinea pigs, rabbits, and mice) is given. The enzymology of pyrethroid metabolism

(hydrolysis and oxidation) is covered. The relationship between metabolism and toxicity is discussed.

80-0235. Holsapple, M. P.; Blake, D. E.; Yim, G. K. W.* (Dep. Pharm. & Toxicol., Sch. Pharm. & Pharmacol. Sci., Purdue Univ., West Lafayette, IN 47907) **Reversible depression of electrically-induced contractions of guinea pig longitudinal muscle by a reversible inhibitor of prostaglandin synthetase.** *Prostaglandins Med.* 3(4): 215-221; 1979 (15 references).

The pesticide chlordimeform (CDM) produced a dose-related inhibition of electrically induced twitch response of guinea pig longitudinal muscle. PGE_2 completely reversed CDM induced twitch depression. PGE_2 also reversed iodomethacin induced twitch depression and partially reversed twitch depression induced by lidocaine. Naloxone and phenolamine did not reduce twitch depression due to CDM. It was concluded that the inhibition of twitch response produced by CDM resembles that of nonsteroidal anti-inflammatory agents. The fact that CDM depression can be reversed by washing was thought to indicate that the guinea pig ileal preparation may be a convenient screen to distinguish reversible from irreversible inhibitors of prostaglandins biosynthesis.

80-0236. Overstreet, D. H.; Russell, R. W.; Helps, S. C.; Messenger, M. (Sch. Biol. Sci., Flinders Univ. South Australia, Bedford Park, South Australia 5042, Australia) **Selective breeding for sensitivity to the anticholinesterase DFP.** *Psychopharmacology* 65(1): 15-20; 1979 (20 references).

A breeding study was made of the genetic factors involved in the sensitivity of rats to the irreversible anticholinesterase diisopropyl fluorophosphate (DFP). Sensitivity was determined giving equal weight to 3 indices of the effects of DFP (1 mg/kg, im) - drinking behavior, body weight, and core body temperature. A resistent line and a sensitive line were established by mating the 6 most resistant pairs and the 6 most sensitive pairs from the original population. In each following generation the 6 most resistant pairs from the resistant line and the 6 most sensitive pairs from the sensitive line were mated. At the F5 generation randomly bred males and females were also tested. Regression analyses were performed to evaluate the effectiveness of the selective breeding procedure. The sensitive line was shown to be more sensitive of DFP than the randomly bred line or the resistant line. The randomly bred and resistant lines, however, were not significantly different from each other. Biochemical studies were made which indicated that the genetic differences in sensitivity to DFP were not dependent on differences in cholinesterase or acetylcholinesterase activity.

80-0237. Savolainen, H.; Pekari, K. (Dep. Ind. Hyg. & Toxicity, Inst. Occup. Health, SF-00290 Helsinki 29, Finland) **Neurochemical effects of peroral administration of technical pentachlorophenol.** *Res. Commun. Chem. Pathol. Pharmacol.* 23(1): 97-105; 1979 (23 references).

Male Wistar rats were administered 20 mg pentachlorophenol (PCP) (containing 2.4% tetrachlorophenol)/l of drinking water for 14 wk. Liver concentrations of the chemicals remained stable throughout the test period, but perirenal fat concentrations of TCP and PCP increased steadily from 14.8 and 35.4 μg/g at 3 wk, to 61.0 and 56.3 μg/g by wk 14, respectively. Only PCP (< 10 μg/g) was found in the brain throughout the experiment. The neurochemical effects of PCP included increased acid proteinase activity at wk 8, increased superoxide dismutase and cerebral NADPH-diaphorase activities throughout the exposure, and reduced GSH-peroxidase activities between wk 8-14.

80-0238. Craciun, V.; Agrigoroaei, S. (Biol. Res. Cent., 6600 Iasi, Romania) **The membrane potential of DDT-treated muscle fibres in K^+-free medium.** *Rev. Roum. Biol., Ser. Biol. Anim.* 23(2): 139-142; 1979 (16 references).

Single muscle fibers of the frog were used to determine the membrane potential of DDT-treated fibers in a medium free of potassium, using the intracellular glass microelectrode technique. A reduction and delay in the membrane hyper polarization in the medium was caused by DDT. This action was dependent on the pH of the medium. It is suggested that membrane hyper polarization under these conditions involved as its basic process a phase transition from globular to laminar micellae through calcium binding, and that the DDT reduces the calcium action on globular micellae.

80-0239. Jaszczuk, E.; Syrowatka, T. (Dep. Toxicol. & Health, Natl. Dep. Hyg., Warsaw, Poland) **Indukcja mitotycznej konwersji u *Saccharomyces cerevisiae* D4 propoksurem karbarylem, dwumetylonitrozoamina oraz produktami ich aktywacji metabolicznej. [Induction of mitotic conversion in *Saccharomyces cerevisiae* D4 with propoxur, carbaryl, dimethyl nitrosamine, and products of their metabolic activation.]** *Rocz. Panstw. Zakl. Hig.* 30(4): 323-330; 1979 (Polish).

Yeast *Saccharomyces cerevisiae* D4 was used to test the convertogenic action of various pesticides and their metabolic activation products. Yeast cells were incubated with 10 m*M* of propoxur, 2.5 m*M* of carbaryl, 2.5 m*M* of N-hydroxycarbaryl, or 100 m*M* of dimethylnitrosamine (DMNA) for 5 hr. While no convertogenic action was seen with *N*-hydroxycarbaryl or DMNA, there was a slight convertogenic action with propoxur and carbaryl, which showed a 2-6 times increase in the frequency of conversion at locus ad2 and try5. The use of hydroxylation medium did not affect the frequency of convertants; however, the hydroxylation medium plus solvent caused a three-fold increase in the frequency of trp^+ convertants. Only the

breakdown products of DMNA and carbaryl caused a statistically significant increase in the frequency of convertants.

80-0240. Pronina, N. B.; Ladonin, V. F. (D. N. Pryanishnikov All-Union Sci. Res. Inst., Fert. & Agric. Soil Sci., Moscow, USSR) **Deistvie 2,4-D na sopryazhenie transporta elektronov s sintezom ATF v khloroplastakh yachmenya i gorokha v snizhenie toksicheskogo deistviya gerbitsida pod vliyaniem fosfornykh udobrenii. [Effect of 2,4-D on the coupling of the transport of electrons with the synthesis of ATP in barley and pea chloroplasts and lowering the toxic effect of a herbicide by using phosphorus fertilizers.]** *S.-Kh. Biol.* 14(1): 41-44; 1979 (5 references) (Russian).

The effect of 2,4-D ($5x10^{-4}$ mole, 5 ml/15-20 plants) on electron transport and ATP synthesis in chloroplasts of barley (resistant plant) and pea (sensitive plant) was studied at normal and doubled P content in the substrate. The plants were treated with 2,4-D during bushing out and followed up for 10-134 hr. The pesticide treatment caused an activation of Hill's reaction. The extent of the increase in the rate of photoreduction of potassium ferricyanide was dependent on the P content in the substrate. Increasing P levels slightly reduced the inhibiting action of 2,4-D on Hill's reaction on pea chloroplasts. In barley plants, the rate of photophosphorylation of potassium ferricyanide increased in the substrate with normal P content, and it was reduced somewhat in the high-P substrate. The experiments showed that 2,4-D not only changed the rate of photochemical synthesis of ATP connected with the cyclic and acyclic transport of electrons, but also the efficiency of this transport. The reaction of the photoperiodic apparatus to 2,4-D was dependent on the specific characteristics of the plants, the availability of P, and the duration of the action of the herbicide.

80-0241. Renovanz, H. D. (Abteilung Med., Firma Basotherm, D-7950 Biberach 1, BRD) **Clearance-Mechanismen an Alveole und Bronchioli respiratorii. [Clearance mechanism of the alveoli and bronchioli.]** *Therapiewoche* 29(43): 7299, 7300, 7302, 7304-7305,; 1979 (39 references) (German).

The physiological and biochemical aspects of the clearance mechanism of alveoli and bronchioli are described. The production or release of surfactant is found to be inhibited by paraquat poisoning.

80-0242. Pipy, B.; Gaillard, D.; Derache, R. (Groupe Rech. Toxicol. Aliments Boissons, I.N,S.E.R.M.-U. 87-Inst. Physiol., 31400 Toulouse, France) **Effect of blockade of the reticulo endothelial system on the carbaryl toxicity in the rat.** *Toxicology* 12(2): 135-142; 1979 (24 references).

Studies were carried out on the role of the reticuloendothelial system (RES) in the toxicity of carbaryl, using the reversible inhibiting effect on blood cholinesterase as a test of carbaryl toxicity. Male Sprague-Dawley rats were pretreated intravenously with a colloidal carbon suspension (to partially inhibit the RES) or with an isotonic solution (contol). Twenty-four hours after pretreatment the rats were given an i.v. dose of 0.75 or 1.50 mg carbaryl/100 g body weight. Blood cholinesterase was determined hourly until normal blood cholinesterase activity returned. Cholinesterase was rapidly inhibited by carbaryl, with the time of "reactivation" of cholinesterase increasing with dose. When the RES is inhibited with colloidal carbon, the "reactivation" of cholinesterase is significantly slowed down. It is shown that inhibition of the RES increases the anticholinesterase activity of carbaryl.

80-0243. Vetterlein, F.; Haase, W. (Inst. Pharmakol. & Toxikol. Univ. Gottingen, D-3400 Gottingen, BRD) **Regional blood flow determinations in the rat during paraoxon-poisoning and treatment with atropine and obidoxime.** *Toxicology* 12(2): 173-181; 1979 (28 references).

Organ perfusion flow rates were studied in male Wistar rats subjected to a 15 minute infusion of paraoxon (150 μg/kg i.v.), a 15 minute infusion of paraoxon and injection of 1.0 mg/kg atropine, or a 15 minute infusion of paraoxon with injection of 10.0 mg/kg obidoxime. Perfusion rates of various organs were determined by the microspheres technique, in which small plastic beads (15 ± 5 μm) are injected into the heart, then their distribution determined microscopically in organ suspensions. Paraoxon-treated animals showed a significantly lower perfusion rate of the kidney, skeletal muscle, skin, and spleen compared to controls, and only slight changes in heart, stomach, small intestine, liver (arterial), and brain. With the injection of atropine + paraoxon, the perfusion rates of heart, kidney, intestine and spleen were greater than with paraoxon alone. With obidoxime + paraoxon, there were significant increases in the perfusion rates compared to those with paraoxon alone in all nine organs studied. It is concluded that the effects of these three compounds on organ flow rates are due to different influences on peripheral and central muscarinic and nicotinic receptors and to changes in depth of respiration.

80-0244. De Meester, C.; Duverger-Van Bogaert, M.; Lambotte-Vandepaer, M.; Roberfroid, M.; Poncelet, F.*; Mercier, M. (Lab. Biotoxicol., Univ. Louvain, Sch. Pharm., B-1200 Brussels, Belgium) **Liver extract mediated mutagenicity of acrylonitrile.** *Toxicology* 13(1): 7-15; 1979 (19 references).

Adult male Wistar rats and adult male NMRI mice were fed a RAL diet. Animals were pretreated with DEM,

ARO, PB, 3-MC, Styrene, butadiene, vinyl chloride, and vinylidene chloride. After this pretreatment they were exposed to acrylonitrile by ip injection, inhalation of vapors, or through their drinking water. The studies suggest that the cytochrome P-450-dependent monooxygenases do not occupy a significant role in the metabolic activation of acrylonitrile into a mutagenic intermediate.

80-0245. Gupta, B. N.; Khanna, R. N.; Datta, K. K. (Ind. Toxicol. Res. Cent. Mahatma Gandhi Marg., Lucknow, 226001, India) **Toxicological studies of ammonium sulfamate in rat after repeated oral administration.** *Toxicology* 13(1): 45-49; 1979 (7 references).

Three groups of 20 rats were exposed to 100, 250, or 500 mg/kg doses of ammonium sulfamate (AMS) over 90 days on a 6 day a week schedule. Appearance, behavior, or survival of the animals was not affected. At the end of 60 days the body weight in adult rats was significantly less than in controls. Food intake was gradually reduced in all groups. Water intake increased. Relative organ weights were not changed. Non-significant increases in neutrophil in the adult and male weanling rats were noted at 90 days during hematological testing. Organs in all groups appeared normal; however, in 1 adult rat slight fatty degenerative changes after 90 days at the 500 mg/kg level was seen.

80-0246. Simon, G. S.; Kuchar, E. J.; Klein, H. H.; Borzelleca, J. F. (Div. Toxicol., Dep. Pharmacol., Med. Coll. Virginia, Virginia Commonwealth Univ., Richmond, VA 23298) **Distribution and clearance of pentachloro nitrobenzene in chickens.** *Toxicol. Appl. Pharmacol.* 50(3): 401-406; 1979 (13 references).

Technical grade PCNB (quintozene) (10% corn oil solution) was added to laying mash and fed to Comet Red and White Leghorn chickens at dietary levels of up to 300 ppm for 16 weeks. The hens were then returned to control diet (clearance phase). The concentrations of PCNB; its impurties, pentachlorobenzene (PCB), hexachlorobenzene (HCB), and tetrachloronitrobenzene (TCNB); and its metabolites, pentachloroaniline (PCA) and pentachlorothioanisole (PCTA), were determined periodically in eggs and excreta, and in various tissues taken at necropsy. Concentrations of PCNB, PCA, and PCTA reached a plateau in tissues and eggs by the second week while HCB and PCB concentrations continued to increase throughout the feeding phase. Excreta were found to contain traces of PCNB, PCA, and PCB. TCNB was not detected in any samples. There were no detectable strain differences in distribution or biotransformation. No effects upon weight gain or egg production were observed nor were there any gross pathologic lesions. During the clearance phase, PCNB, PCA, and PCTA were undetectable by the 16th-week, while HCB and PCB remained at levels > 0.002 ppm through 1 year of clearance. The half-life of HCB was determined to be 90 days. The level of HCB in edible tissues and eggs, extrapolated to their maximum possible steady-state concentration, were determined not to pose a health hazard to humans, when chickens are fed diets containing PCNB at 300 ppm. (Author abstract by permission, abridged)

80-0247. Siddik, Z. H.; Drew, R.; Gram, T. E. (Lab. Toxicol., NCI, Natl. Inst. Health, Bethesda, MD 20014) **The effects of chlorpromazine on the uptake and efflux of paraquat in rat lung slices.** *Toxicol. Appl. Pharmacol.* 50(3): 443-450; 1979 (20 references).

The uptake of paraquat by rat lung slices was inhibited by chlorpromazine in a concentration- and time-dependent manner. In addition, the efflux of paraquat from lung slices was enhanced by chlorpromazine in a similar fashion. These *in vitro* findings suggested that chlorpromazine might be useful *in vitro* in reducing pulmonary paraquat content and, in turn, its pneumotoxicity. However, chlorpromazine potentiated the lethal toxicity of paraquat rather than ameliorating it. This potentiation by chlorpromazine was found to correlate with a reduction in the urinary excretion of paraquat and concomitant increase in pulmonary paraquat concentrations. (Author abstract by permission)

80-0248. Singh, O.; Agarwal, R. A. (Dep. Zool., Univ. Gorakhpur, Gorakhpur, U.P., India) **Effects of certain carbamate and organophosphorous pesticides on isolated organs of *Pila globosa* (Gastropoda).** *Toxicol. Appl. Pharmacol.* 50(3): 485-492; 1979 (17 references).

The pharmacological actions of three carbamates, viz. Zectran (mexacarbate), carbaryl, aldicarb, and two organophosphorous pesticides, viz. formothion and trichlorfon, have been studied on isolated heart, median dorsal radula protractor muscle, and rectum of the snail *Pila globosa*, a pest of paddy crops in India. All five pesticides altered the response to exogenously applied acetylcholine (ACh). The order of effectiveness in the case of carbamates was Zectran > carbaryl > aldicarb. Among the organophosphates, formothion was more potent than trichlorfon. Both groups of pesticides selectively showed cholinomimetic properties on the excitor or inhibitor receptors of ACh in this animal. The effect of organophosphorous compounds was found to be time dependent. The structure-activity relationship of these pesticides has been discussed. (Author abstract by permission)

80-0249. Abou-Donia, M. B. (Dep. Pharmacol., Duke Univ. Med. Cent., Durham, NC 27710) **Delayed neurotoxicity of *O*-(2,4- dichlorophenyl) *O*-ethyl**

phenylphosphonothioate (S-Seven). *Toxicol. Lett.* 3(2): 61-64; 1979 (10 references).

Eight groups of 18-mo old hens were given a single oral dose of 100-5,000 mg/kg of S-Seven (EPBP). Hens receiving a dose of 800-5,000 mg/kg developed ataxia 7-13 days after administration of the insecticide. Two of 3 hens receiving the highest dose developed paralysis at 34 and 48 days. Birds given doses 1200-3000 mg/kg S-Seven developed ataxia at 22-29 days. Since no deleterious effects were noted in birds dosed at levels below 800 mg/kg, this value was determined to be the "threshold dose". Atropine sulfate (30 mg/kg in water) prevented the neurotoxic effects of the pesticide.

80-0250. Benard, P.; Cambon, C.; Declume, C. (Lab. Radioelem. & Etud. Metabol., Ec. Natl. Vet., Univ. Paul Sabatier, F-31400, Toulouse, France) **Passage of radioactivity into the milk of rats treated with ^{14}C carbaryl.** *Toxicol. Lett.* 4(3): 149-153; 1979 (8 references).

Whole body autoradiography techniques were used to trace the passage of radioactivity into the milk of rats fed 10 mg/kg ^{14}C carbaryl and the levels in the bodies of their offsprings. Five hr after administration of the labeled pesticide mean radioactivity was localized mainly in the urinary bladders of the neonates. At 24 hr radioactivity was present in all body tissues of the dams, particularly in the bone marrow; in the offspring the highest activity was in the stomach contents. By the end of 48 hr concentrations of radioactivity were highest in the liver, hair, and bone marrow of the newborn.

80-0251. Olorunsogo, O. O.; Bababunmi, E. A.; Bassir, O. (Biochem. Dep., Univ. Ibadan, Ibadan, Nigeria) **The inhibitory effect of *N*-(phosphonomethyl) glycine *in vivo* on energy-dependent, phosphate-induced swelling of isolated rat liver mitochondria.** *Toxicol. Lett.* 4(4): 303-306; 1979 (25 references).

In order to study the effects on liver mitochondria rats were given a single ip dose of 0, 30, 60, 120, or 240 mg/kg of the herbicide *N*- (phosphonomethyl) glycine (PMG). Five hr later, mitochondria were isolated from the liver, and mitochondria swelling was estimated spectro photometrically at 520 nm. Treatment with PMG caused a significant inhibition of energy-dependent, phosphate-induced swelling of rat mitochondria, with 40 and 65% inhibition with doses of 120 and 240 mg PMG/kg, respectively. It is suggested that these reactions may be due to the uncoupling effect of PMG on oxidative phosphorylation.

80-0252. Jolly, A. L., Jr.; Avault, J. W., Jr.; Koonce, K. L.; Graves, J. B. (Fish. Div., Sch. For. & Wildl. Manage., Louisiana State Univ., Baton Rouge, LA 70803) **Acute toxicity of permethrin to several aquatic animals.** *Trans. Am. Fish. Soc.* 107(6): 825-827; 1978 (13 references).

The acute toxicity of the synthetic pyrethrid permethrin to various aquatic species was determined. The 96 hr LC50 values for 8-12 and 20-30 mm Louisiana red swamp crayfish, fry channel catfish, fingerling largemouth bass, mosquitofish, and bullfrog tadpoles were 0.39 and 0.62, 1.1, 8.5, 15.0, and 7033 μg/l, respectively. According to these results permethrin exhibits a high degree of toxicity, comparable to the most toxic organochlorines such as endrin, DDT, and toxaphene.

80-0253. Steverink, A. T. G.; Jansen, J. (Inst. Pluimveeonderzoek, Beekbergen, The Netherlands) **Chloorfenolen in houtkrullen en mufheid in slachtgevogelte en eieren. [Chlorophenols in wood shavings and off flavor in poultry and eggs.]** *Voedingsmiddelen Technol.* 12(14): 24-27; 1979 (22 references) (Dutch).

Wood shavings used as litter in a poultry farm were analyzed gas chromatographically to identify the cause of the off flavor of eggs and poultry meat. Thirty-two samples were analyzed. The cause of the off flavor was determined to be the presence of wood preservatives in the wood shavings. 2,4,6-Trichlorophenol (0.2-15 mg/kg), 2,3,4,6-tetrachlorophenol (0.4-100 mg/kg in 31 samples, 596 mg/kg in 1), and pentachlorophenol (PCP) (0.05-87 mg/kg) were found in the wood shavings.

80-0254. Dalela, R. C.; Bansal, S. K.; Gupta, A. K.; Verma, S. R. (Pollut. Relevant Res. Lab., Dep. Zool., DAV Coll., Muzaffarnagar 251001, India) **Effect of solvents on *in vitro* pesticides inhibition of ATPase in certain tissues of *Labeo rohita*.** *Water Air Soil Pollut.* 11(2): 201-205; 1979 (9 references).

A freshwater teleost *Labeo rohita* was exposed *in vitro* to treatment with chlordane and metasystox (oxydemeton-methyl). These chemicals were dissolved in different organic solvents such as benzene, cyclohexane, cyclopentane, dimethylacetamide, dimethylformamide, dimethylsulfoxide, or acetone: ethanol (1:1 mixture). The inhibitory effect of chlordane on the ATPase in the gills and brains of the test species was significantly reduced when exposure was chlordane with cyclohexane, cyclopentane, and benzene acting as solvents. This inhibitory effect was less with DMA, DMF, and DMS, and to an even lesser extent when the solvent was acetone: ethanol. It is noted that the choice of solvent to be used can have a great effect on the degree of ATPase inhibition results obtained.

80-0255. Crowley, R. H.; Teem, D. H.; Buchanan, G. A.; Hoveland, C. S. (Dep. Agron., Univ. Arkansas, Southeast Res. & Ext. Cent., Monticello, AR 71655) **Response of *Ipomoea* spp. and *Cassia* spp. to**

preemergence applied herbicides. *Weed Sci.* 27(5): 531-535; 1979 (10 references).

Responses of six morningglories (*Ipomoea* spp.) and two *Cassia* spp. to 13 preemergence applied herbicides were determined at two locations in southern Alabama. Pitted (*I. lacunosa* L.), cypressivine (*I. quamoclit* L.), and willowleaf morningglories (*I. wrightii* Gray) were readily controlled with metribuzin [4-amino- 6-*tert*- butyl-3-(methylthio)- *as*-triazin- 5 (4H)-one]; entireleaf [*I. bederacea* (L.) Jaccq. var. *integriuscula* Gray], tall [*I. purpurea* (L.) Roth.], and ivyleaf morningglories [*I. hederacea* (L.), Jacq.] were not controlled. Norflurazon [4-chloro-5- (methylamino)-2- α,α,α- trifluoro- *m*-tolyl)-3 (2H)- pyridazinone] controlled cypressivine morningglory, but did not adequately control the other morningglory species. Perfluidone [1,1,1- trifluoro- *N*- [2-methyl- 4-(phenylsulfonyl) phenyl] methane sulfonamide] gave acceptable control of cypressive and willowleaf morningglories, but gave poor control of other morningglory species. Sicklepod (*C. obtusifolia* L.) was controlled better than coffee senna (*C. occidentalis* L.) with 2.2 kg/ha diuron [3-(3,4- dichlorophenyl)- 1,1- dimethylurea] and 2.2 kg/ha cyanazine [2- [[4-chloro- 6-(ethylamino)- *s*-triazin- 2-yl] amino]- 2-methyl propionitrile] controlled sicklepod better than coffee senna at one location each. Oxadiazon [2- *tert*- butyl-4- (2,4-dichloro- 5- isopropoxyphenyl)- Δ^2-1,3,4- oxadiazolin- 5-one] was more effective in controlling coffee senna than sicklepod. Induction of population shifts toward incidental species of these genera seems unlikely based on the herbicides included in these experiments. In most cases the incidental species were more readily controlled than the prominent weed species. (Author abstract by permission)

80-0256. Weiland, R. T.; Stutte, C. A.; Talbert, R. E. (Dep. Agron., Altheimer Lab., Univ. Arkansas, Fayetteville, AR 72701) **Foliar nitrogen loss and CO_2 equilibrium as influenced by three soybean (*Glycine max*) postemergence herbicides.** *Weed Sci.* 27(5): 545-548; 1979 (20 references).

Forest soybean [*Glycine max* (L.) Merr.] infested with entireleaf morningglory (*Ipomoea hederacea* (L.) Jacq. var. *integriusula Gray*] were treated in the field with three postemergence herbicides, dinoseb (2-*sec*- butyl-4,6-dinitrophenol), sodium salt of acifluorfen [5- [2-chloro- 4-(trifluoromethyl) phenoxy] -2- nitrobenzoic acid], and 2,4-DB [4- (2,4- dichlorophenoxy) butyric acid]. Foliar nitrogen (N) loss, transpiration, and CO_2 equilibrium concentrations were measured from 4 to 148 hr after treatment. In morningglory foliar N loss was increased by dinoseb, decreased by acifluorfen, and first increased and then decreased by 2,4-DB treatments. Transpiration in this weed species was decreased by all three herbicides. In soybean, N loss was increased and transpiration decreased with dinoseb; acifluorfen did not affect either activity; and 2,4-DB decreased both processes during one sampling period. In both plant species dinoseb increased the CO_2 equilibrium concentration within 4 hr after treatment. Treatments with acifluorfen and 2,4-DB initially increased the CO_2 concentration in morningglory with major increases noted at the onset of chlorosis 52 hr after treatment. In soybean, some significant decreases in CO_2 equilibrium concentrations occurred with the lowest rate of all three herbicides. (Author abstract by permission)

80-0257. Putnam, A. R.; Rice, R. P., Jr. (Dep. Hortic., Pestic. Res. Cent., Michigan State Univ., East Lansing, MI 48824) **Environmental and edaphic influences on the selectivity of alachlor on snap beans (*Phaseolus vulgaris*).** *Weed Sci.* 27(5): 570-574; 1979 (17 references).

The influence of several environmental and edaphic factors on alachlor [2-chloro-2 ', 6'- diethyl -*N*-methoxymethyl) acetanilide] selectivity in snap bean (*Phaseolus vulgaris* L.) was examined. Crop safety was consistently improved when alachlor was applied preplant incorporated as compared to surface preemergence treatment. Under field conditions, maximum injury occurred either when temperatures during germination were cool and rainfall was minimal, or when temperatures approached or exceeded 27°C and the soil was saturated. In the growth chamber, more damage occurred under low temperature regimes, although volatilization of alachlor from moist soil also produced injury under higher temperatures. Injury was less severe in soils high in organic matter content. Alachlor injury decreased after 5 cm of simulated rainfall were applied on a loamy sand. (Author abstract by permission)

See also 80-0001, 80-0008, 80-0009, 80-0015, 80-0020, 80-0021, 80-0022, 80-0027, 80-0075, 80-0081, 80-0084 *and* 80-0088.

80-0258. Hites, R. A.; Jungclaus, G. A.; Lopez-Avila, V.; Sheldon, L. S. (Dep. Chem. Eng., Massachusetts Inst. Technol., Cambridge, MA 02139) **Potentially toxic organic compounds in industrial wastewaters and river systems: two case studies.** *ACS Symp. Ser.* 94: 63-90; 1979 (32 references).

Sample isolation methods used with gas chromatography mass spectrometry (GC-MS) are reviewed. The first case study presented is that of a specialty chemicals plant which produces many different chemicals including pharmaceuticals, herbicides, antioxidants, thermal stabilizers, ultraviolet light adsorbers, optical brighteners, and surfactants. Among the commonly observed compounds in the river was 2-chloro-4,6- bis-isopropylamino- s- triazine (propazine). The second case history reviewed concerns the organic compounds found in the Delaware River complex system surrounded by various chemical manufacturing activity. Two chemicals found in this study which had not previously been detected in water as contaminants were chloro (trifuloromethyl) aniline and chloro (trifluoromethyl) nitrobenzene, both of which are common sub-structures in various pesticide molecules.

80-0259. Fusi. P.; Franci, M.; Bosetto Fusi, M. (0 Ist. Chim. Agrar. For. Univ. Firenze, I-50144 Florence, Italy) **Adsorption and desorption of prometryne and prometone by an activated charcoal.** *Agric. Ital. (Pisa)* 107(33): 93-109; 1978 (21 references).

Adsorption of prometryne and prometone on activated charcoal was studied. For high concentrations of *s*-triazines the relative isotherms followed the Freundlich equation. Adsorption decreased in the following order: prometryne, atrazine, prometone at 5 and 25° C, and prometryne, prometone, atrazine at 40° C. The presence of active acidic centers on the adsorbent formed during charcoal activation may explain the adsorption of *s*-triazines. When the equilibrium between the amounts of atrazine and prometryne adsorbed and in water solution is reached a desorption of atrazine and prometryne by the water occurs. Desorption of prometone in water is totally independent of the adsorbed amount.

80-0260. Cotterill, E. G. (Agric. Res. Counc., Weed Res. Organ., Yarnton, Oxford OX5 1PF, England) **Effect of ammonium nitrate on the gas-chromatographic determination of some pesticide residues in soils.** *Analyst (London)* 104(1242): 878-880; 1979 (1 reference).

In the course of routine measurements of atrazine residues in soil samples containing high levels of ammonium nitrate fertiliser, the response of the gas-chromatographic detector was not constant for standards interspersed with the samples. The peak height but not the peak area increased, suggesting an increase in column efficiency. This effect was studied in order to define it more closely. (Author abstract by permission)

80-0261. Robbins, W. K. (Exxon Res. & Eng. Co., Linden, NJ 07036) **Representation of extraction efficiencies.** *Anal. Chem.* 51(11): 1860-1861; 1979 (8 references).

A method of graphicaly representing extraction efficiences is presented. The theory of extraction efficiency use is first discussed, providing equations for distribution equilibria of a compound in the solvent and extractant phases. A graph relating efficiency of extraction is presented. The distribution ratio (KD) is plotted against the percent extracted, with a line for each of one, two and three extractions. With this graph, rapid comparison of systems with known KD can be made; volume ratios can be selected; systems with adequate KD can be selected; and, the number of extractions to obtain 99% extraction can be determined.

80-0262. Armstrong, D. W.; Terrill, R. Q. (Dep. Chem., Bowdoin Coll., Brunswick, MA 04011) **Thin layer chromatographic separation of pesticides, decachlorobiphenyl, and nucleosides with micellar solutions.** *Anal. Chem.* 51(13): 2160-2163; 1979 (10 references).

The use of micellar solutions as mobile phases in thin layer chromatography (TLC) is described for the first time. The possible advantages of micellar solutions over traditional pure and mixed solvent systems are described. *p,p'*-DDT; *p,p'*-DDD (TDE); *p,p'*-DDE and decachlorobiphenyl were chromatographed using aqueous solutions of sodium dodecyl sulfate (SDS) with polyamide and alumina thin layer sheets. A reversed micellar solution was shown to separate the nucleosides adenosine, cytidine, guanosine, and uridine using a reversed phase TLC sheet. Possible mechanisms to account for the observed chromatographic behavior are discussed. (Author abstract reprinted by permission of American Chemical Society)

80-0263. Doerffel, K.; Lorenz, G.; Tagle, I. (Tech. Hochsch. Carl Schorlemmer, DDR-42 Merseburg, DDR) **Ermittlung der analysenfrequenz bei diskontinuierlichen prozessanalytischen verfahren. [Establishment of the frequency of analysis for discontinuous measurements in process control.]** *Anal. Chim. Acta* 112(3): 313-319; 1979 (11 references) (German).

Application of sampling theory to industrial chemical processes involves special problems arising from the peculiarities of the processes and of the analytical work. Apart from the process itself, it is necessary to consider the statistical error of the correlation function caused by the finite length of the observed signal. Knowledge of the correlation time of the stochastic signal makes it possible to estimate the optimal time-difference between two analyses, depending on the variance of the process and the allowed analytical tolerance. (Author abstract by permission)

80-0264. Szrzedzinski, J. (Dep. Med., Acad. Med., Bialymstok, Poland) **Metoda ekstrakeji trucizn organicznych z materialu biologicznego za pomoca acetonitrylu. [Method for extraction of organic poisons from biological material using acetonitrile.]** *Arch. Med. Sadowej Kryminol.* 28(3): 199-206; 1978 (14 references) (Polish).

A direct method of extracting drugs and pesticide residues from biological materials is described. The toxins were incubated with liver homogenates for 14 hr at 4°C prior to extraction with acetonitrile. The extracts were filtered into 550 cm^2 of 2.5% Na_2SO_4 solution, followed by further extraction with ethyl ether and chloroform. After purification, the extracts were examined by TLC and GC. The advantages of the method include shortened extraction time, the high degree of purity of the extracts, and the high yield of the final product.

80-0265. Self, R. (Food Res. Inst., Norwich, England) **Recent developments in the estimation of trace toxic substances in food.** *Biomed. Mass Spectrom.* 6(9): 361-373; 1979 (125 references).

The use of mass spectrometry to determine trace toxic substances in food is reviewed. The general areas covered are nitrosamines, mycotoxins, and industrial chemicals. The use of mass spectrometry to test for pesticide residues in foods is discussed. It is pointed out that this method is particularly useful for the detection of *p,p'*-DDE and *p,p'*-DDT in the presence of polychlorinated biphenyls. The use of this method for the determination of TCDD, the amino acid conjugates of 2,4-D, and the metabolites of benomyl is discussed. The advantages and the limitations of the technique are covered.

80-0266. Singh, J.; Cochrane, W. P.; Scott, J. (Lab. Serv. Div., Food Prod. & Mark. Branch, Agric. Canada, Ottawa, Ontario, K1A OC5, Canada) **Extractive acylation of ethylenethiouria from water.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 470-474; 1979 (14 references).

A procedure is presented in which the extractive derivatisation of ethylenethiourea (ETU) is partitioned from water into the organic phase at room temperature. ETU is disolved in CH_3CN -water mixture; DCAA in CH_2Cl_2 is then added and layers allowed to form. The CH_2Cl_2 layer is passed through Na_2SO_4. It is evaporated to dryness, then the residue is dissolved in benzene and analyzed by GC-ECD. Retention times for various columns are presented, as is the derivatisation scheme for ETU, showing the chemical structures of the intermediate compounds. The method can be used as a rapid screening procedure for the presence of ETU in water samples at the 0.01-0.05 ppm level.

80-0267. Krechniak, J.; Foss, W. (Dep. Chem. Toxicol., Med. Sch., PL 80 416, Gdansk, Poland) **Determination of propoxur and 2-isopropoxyphenol in blood, urine and tissues.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 531-535; 1979 (3 references).

Studies were performed to determine a procedure for separating propoxur from its metabolite 2- isopropoxyphenol in blood, urine and tissues by thin layer chromatography (TLC) and gas chromatography (GC). Samples were enriched with varying amounts of the pesticide, ranging from 0.1 to 0.5 μg in 1 ml solvent. A Pye 104 GC unit with Ni^{63} electron capture detector with columns packed with chromosorb WHMD 80-100 mesh with 10% DC-200 and a confirmation column packed with HMDS 100-120 mesh coated with 1.5% OV-17/2% QFi was used. Recovery by TLC was 91-92% for propoxur and 90-98% for the metabolite. GC recoveries were highest from kidney (89-101%) for propoxur and highest from liver (91-98%) and kidney (89-100%) for the metabolite. Lowest recoveries for both compounds were from urine, 79 and 75% for propoxur and the metabolite, respectively. Typical chromatograms are presented.

80-0268. Hollifield, H. C. (Div. Chem. Tech., US FDA, Washington, DC 20204) **Rapid nephelometric estimate of water solubility of highly insoluble organic chemicals of environmental interest.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 579-586; 1979 (22 references).

A study is presented in which nephelometric techniques are used to determine water solubilities of highly insoluable organics. Dilutions of increasing amounts of test substances dissolved in a water-miscible solvents, with relatively large volumes of water, give a series of turbid suspensions. The turbidity is measured nephelometrically and the relative intensity of scattered light is plotted versus concentration of test material in each sample. Extrapolation of this curve gives experimentally determined solubilities. Test substances included aromatic hydrocarbons, chlorinated hydrocarbons, chlorinated hydrocarbon mixtures, phthalates and phosphates. In some cases there were as much as 30-fold differences between the experimentally determined solubilities and the cited solubilities.

80-0269. Riskallah, M. R.; El-Sayed, M. M.; Hindi, S. A. (Cent. Agric. Pestic. Lab., Inst. Plant Prot., Agric. Res. Cent., Giza, Egypt) **Study on the stability of leptophos in water under laboratory conditions.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 607-614; 1979 (17 references).

In order to study the stability of the phosphonate insecticide leptophos in water, water samples were collected from 6 different sources (tap, well, river, irrigation canal, drainage canal, and distilled water). Leptophos as a 30% emulsifiable concentrate was added to each sample to give a concentration of 1.18 μg active ingredient/ml, and held at room temperature. After various intervals from 3 days to

16 wk, samples were extracted with benzene and leptophos analyzed using a gas chromatograph with a flame-photometric detector sensitive to phosphorous. Leptophos was found to be a rather stable compound which degraded to seven unidentified degradation products. After 16 wk, 2.8-39% of the leptophos remained unchanged in distilled, tap and well water, while 43-100% of the leptophos remained in the river, irrigation and drainage waters. It is thought that the presence of clay, colloidal particles, and organic matter and the high value for total hardness in the second group of water samples contributed to the reduced degradation rate.

80-0270. Miyazaki, T.; Akiyama, K.; Kaneko, S.; Horii, S.; Yamagishi, T. (Tokyo Metrop. Res. Lab. Public Health, Hyakunincho, Shinjuku-ku, Tokyo, 160 Japan) **Identification of trans-nonachlor in goby-fish from Tokyo Bay.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 631-635; 1979 (13 references).

Studies were performed to identify an unknown compound appearing as a peak in GC analysis of fish and shellfish from Tokyo Bay. The products were chromatographed on florisil. Elution with n-hexane gave *trans-* and *cis-* nonachlors successively. Recrystalization gave no other peaks by GC. Melting points were 128.2-128-5 and 214.5-215.2°C for the *trans* and *cis* compounds, respectively.

80-0271. Adam, M. J.; Hall, L. D. (Dep. Chem., Univ. British Columbia, Vancouver, British Columbia V6T 1W5, Canada) **Covalent, nitroxide spin-labelling of carbohydrates *via* *s*-triazine residues.** *Carbohydr. Res.*, 68: C17-C20; 1979 (5 references).

A method of spin-labeling of carbohydrates is presented. The use of *s*-triazine trichloride for attaching mono- or bi- radicals to monosaccharides via O-, S-, or N-linkages in aqueous or non-aqueous media and to polysaccharides in aqueous media is described. The chemical structures of three reagents are described, along with the reactions involved in spin-labeling.

80-0272. Alfonso Hernandez, M. M. (Inst. Invest. Fundam. Agric. Trop. Alejandro de Humboldt, Acad. Cienc. Cuba, Havana, Cuba) **Metodo analitico para determinar residuos de algunas fenil-ureas en suelo. [Analytical method for the determination of some phenylurea residues in soils.]** *Cienc. Agric.* 2: 135-140; 1978 (14 references) (Spanish).

A method for the determination of phenylurea pesticides residues in soil is described with respect to diuron and monuron as model substances. Following extraction with acetone, the metabolites (*p*-chloroaniline and 3,4-dichloroaniline) are removed by TLC on silica gel G, using benzene: dioxane: acetic acid (90:25:4) for development. The aromatic amines are then diazotized and coupled with 1-naphthyl ethylene diamine. The absorbance is determined at 560 nm. Recovery rates of 80-85% were found at concentrations of 0.5-10 ppm. The limit of detection is 0.3 ppn.

80-0273. Briggs, R. W. (Univ. Arkansas, Fayetteville, AR 72701) **I. Thallium-205 nmr spectroscopy: studies of organothallium compounds and of the solvation and complexation of Tl^+ and $(CH_3)_2Tl^+$ ions. II. Phosphorus-31 nmr studies of degradation of organophosphorus pesticides.** *Diss. Abstr. Int. B.* 40(3): 1185-1186; 1979.

The organometalic chemistry of thallium, and the solvation of complexation of the Tl^+ and $(CH_3)_2Tl^+$ ions, were investigated by ^{205}Tl and ^1H nmr. The degradation of organophosphorus pesticides was followed by ^{31}P nmr. Use of ^{31}P nmr to monitor the degradation of the pesticides ethyl parathion (parathion), methyl parathion, and supracide (methidathion) allows the concomitant observation of phosphorus-containing decomposition products. In a 7:3 methanol: water solution, the degradation rate decreases in the order supracide > methyl parathion > ethyl parathion, at 60°, 70°, and 90°C. Pseudo first-order rate constants and half-lives were determined for the three compounds at the three temperatures, from which energies of activation were derived. (Author abstract by permission, abridged. Copies of the thesis are available from University Microfilms, order No. 7919231)

80-0274. Stout, V. F.; Beezhold, F. L. (Northwest & Alaska Fish. Cent., Natl. Mar. Fish. Serv., NOAA, Seattle, WA 98112) **Analysis of chlorinated hydrocarbon pollutants: a simplified extraction and cleanup procedure for fishery products.** *Fish. Bull* 76(4): 880-886; 1979 (5 references).

A simple, rapid, and reliable method for the extraction and cleanup of fish, fishery products, and paper samples for analysis of chlorinated hydrocarbons is presented in laboratory manual form. The chemicals analyzed by this method include PCB, dieldrin, and DDT and its metabolites. This homogenization, heat concentration and column separation procedure eliminates extraction of fish oil and provides final extracts free of extraneous substances. The method is judged suitable for the routine analysis of marine fishery products.

80-0275. Schouten, M. J.; Copius Peereboom, J. W.; Brinkman, U. A. T. (Dep. Anal. Chem., Free Univ., Amsterdam, The Netherlands) **Liquid chromatographic analysis of phthalate esters in Dutch river water.** *Int. J. Environ. Anal. Chem.* 7(1): 13-23; 1979 (30 references).

High performance liquid chromatography (HPLC)

or gas chromatography (GC) were employed in the analyses of the phthalate esters di-(2- ethylhexyl) phthalate (DEHP; dioctyl phthalate) and di-*n*- butyl phthalate (DBP; dibutyl phthalate) from three rivers in The Netherlands. DEHP values were approximately equal (1 ppb) in all of the river samples; 0.3-0.5 ppb DBP values were found in the Rhine and Meuse Rivers, while 2 ppb DBP levels were present in the IJssel River.

80-0276. Caplan, Y. H.; Thompson, B. C.; Hebb, J. H., Jr. (Off. Chief Med. Exam., Baltimore, MD 21201) **A method for the determination of chlordecone (Kepone) in human serum and blood.** *J. Anal. Toxicol.* 3(5): 202-205; 1979 (14 references).

A simplified method for the quantitative determination of chlordecone (Kepone) in serum and blood is presented. Selective separation and extraction using benzene is followed by gas chromatography using an electron capture detector and a 10% DC-200 on 100/120 mesh Gas-Chrom Q column. Mean recovery from whole blood was 24.7% and from serum 43.2%. This highly reproducible method is sensitive to a concentration of 10 μg/l in a 1 ml sample.

80-0277. Balkon, J.; Leary, J. A. (Toxicol. Lab., Dep. Lab., Long Island Jewish Hillside Med. Cent., Glen Oaks, NY 11004) **An initial report on a comprehensive, quantitative, screening procedure for volatile compounds of forensic and environmental interest in human biofluids by GC/MS.** *J. Anal. Toxicol.* 3(5): 213-215; 1979 (3 references).

A screening procedure is described for analysis of biological specimens for potentially toxic, volatile and gaseous substances. A headspace concentration technique is used for isolation, and gas chromatography- mass spectrometry is used for detection and identification. Extracted ion profiles are used to identify a particular gas or volatile substance. Quantification is done by specific ion current measurement of the major component ion, modified by the corresponding ion current of a simultaneously run internal standard. It is shown that up to 30 different gaseous and volatile toxic substances can be isolated at concentrations approaching the part per million level.

80-0278. Sundaram, K. M. S.; Szeto, S. Y.; Hindle, R. (For. Pest Manage. Inst., Canadian For. Serv., Environ. Canada, Sault Ste. Marie, Ontario P6A 5M7, Canada) **Evaluation of Amberlite XAD-2 as the extractant for carbamate insecticides from natural water.** *J. Chromatogr.* 177(1): 29-34; 1979 (12 references).

A rapid and sensitive analytical technique to quantify carbamate insecticides at nanogram levels is reported using resin column and sorption, and desorption followed by N-P gas-liquid chromatography (GLC) analysis. The carbamates were extracted from natural water by percolation through a column of Amberlite XAD-2, followed by elution with ethyl acetate. The carbamate residues were directly analyzed by GLC with a Tracor Model 702 N-P detector. The recoveries for several carbamates including aminocarb, mexacarbate, carbaryl, propoxur, carbofuran, pirimicarb and methiocarb were from 86 to 108% at 1.0 and 0.01 ppm levels. Only 41-58% was recovered for methomyl. The extraction efficiency of Amberlite XAD-2 was pH-dependent as indicated in the extraction of aminocarb. More than 90% of the added aminocarb was recovered from phosphate buffer by the described method at pH 5.0 to 7.5 at 5.0 and 0.5 ppm levels. (Author abstract by permission)

80-0279. Paschal, D. C.; Needham, L. L.; Rollen, Z. J.; Liddle, J. A. (Clin. Chem. Div., Bur. Lab., CDC, PHS, US Dep. HEW, Atlanta, GA 30333) **Determination of paraquat in sunflower seeds by reversed-phase high-performance liquid chromatography.** *J. Chromatogr.* 177(1): 85-90; 1979 (10 references).

The herbicide paraquat was determined with extracts from 1 g samples of sunflower seeds. The liquid chromatography procedure utilized a microparticle (10 μ*M*) C_{18} reversed-phase column and isocratic elution with 27% acetonitrile in water, 10 m*M* in the sodium salt of octane sulfonic acid. Eluted paraquat was detected at 254 and 280 nm and quantitated by paraquat internal standard peak height ratios. This procedure provided linear working curves over the concentration range of 0-20 μg/g of paraquat. Recovery of paraquat varied from 89-101%, with an average recovery of 93%. Good agreement was obtained in the comparison of results of the described procedure with those from a well established UV procedure. (Author abstract by permission)

80-0280. Grossmann, H.; Lieflander, M. (Inst. Chem., Univ. Regensburg, D-8400 Regensburg, BRD) **Affinitaetschromatographische reinigung und eigenschaften der acetylcholinesterase aus kobragift (*Naja naja atra*). [Purification by affinity chromatography and properties of acetylcholinesterase of Formosan cobra (*Naja naja atra*) venom.]** *J. Chromatogr.* 177(1): 99-107; 1979 (31 references) (German).

The cobra acetylcholinesterase was purified by CM-Sephadex chromatography and affinity chromatography on Sepharose bound *m*-[6-(6-aminocaproylamino) caproylamino] phenyltrimethyl ammonium bromide. The purified enzyme was obtained with a specific activity of 5470 *u*/mg (1160-fold purification) and a 89% yield. The molecular weight of the native enzyme was estimated to be 144,000. The enzyme is split into two subunits of approximately equal molecular weight (*M*, 69,000) by SDS treatment. It is a glycoprotein and can be

resolved by disc gel electrophoresis into seven and by isoelectric focusing into more than ten multiple forms. The N-terminal amino acid is serine. (Author abstract by permission)

80-0281. Murray, D. A. J. (Dep. Fish. & Oceans, Freshwater Inst., Winnipeg, Manitoba R3T 2N6, Canada) **Rapid micro extraction procedure for analyses of trace amounts of organic compounds in water by gas chromatography and comparisons with macro extraction methods.** *J. Chromatogr.* 177(1): 135-140; 1979 (12 references).

A micro extraction procedure is described which allows direct gas chromatography to follow the relatively simple procedure. The extraction flask contains 980 ml of water and 200 μl of hexane and is manually shaken for 2 min. The flask is then tilted and water is carefully added through the side arm. The solvent layer is held in the center portion and displaced into the capillary tube. The recovered material is suitable for direct analysis by gas chromatography. The micro method offers superior concentration factors, the absence of a concentration step, and speed of analysis which are advantagous in routine quantitative analyses of water samples.

80-0282. Wu, A.; Pearson, M. L.; Shekoski, D. L.; Soto, R. J.; Stewart, R. D. (Div. Environ. & Occup. Med., Dep. Pharmacol. & Toxicol., Med. Coll. Wisconsin, Milwaukee, WI 53226) **High resolution gas chromatography/ mass spectrometric characterization of urinary metabolites of *N,N*-diethyl- m-toluamide (deet) in man.** *J. High Resolut. Chromatogr. Chromatog. Commun.* 2(9): 558-562; 1979 (8 references).

A 30-yr-old male subject applied 10.4 g of deet in a commercial insect repellent to 75% of his skin surface. Metabolites found in the urine over a 36 hr period were identified by high resolution gas chromatography/ mass spectrometry. It is suggested from this study that the primary route of metabolism of this substance in man is by oxidation of the benzylic moiety and hydroxylation of the side chain of deet molecules.

80-0283. Knepil, J. (Gartnaval Gen. Hosp., Glasgow G12 OYN, Scotland) **Measurement of plasma-paraquat concentration.** *Lancet* 2(8144): 699; 1979 (5 references).

A note is presented in which the use of a simple colorimetric method of paraquat detection is prescribed over the complicated radioimmunoassay. Crystalline paraquat dichloride was dissolved in sulfuric acid giving a concentration of 1 mg/dl. The absorbance value by spectro photometry was recorded at 257.5 nm. Absorbance values for other concentrations were recorded for use as a standard curve for future, rapid, analyses for plasma paraquat concentrations.

80-0284. Vieth, F. (Bayer. Landesanst. Wasserforsch., Munich, BRD) **Anwendung von pestizidanalytik bei der Aufklaerung von Fischsterben. [Use of pesticide anlaysis during the clarification of fish deaths.]** *Muench. Beitr. Abwasser. Fisch. Flussbiol.* 30: 209-214; 1978 (5 references) (German).

A procedure for identification of pesticides that can cause massive fish deaths is described. Water samples are extracted with hexane and stored frozen until ready for gas chromatographic analysis. Fish samples are extracted with dichloromethane: methanol and again with an acetone: hexane mixture (1:2), after which the pesticide is identified on a twin-column gas chromatograph with flame-ionization detector and electron capture detector. If this method is not specific enough, the gas chromatographic step should be combined with mass spectrometry.

80-0285. Takagi, S.; Shinomiya, T. (Sch. Legal Med., Fac. Med., Ehime Univ., Matsuyama, Ehime, Japan) **[New information on the quantification of endrin in an endrin emulsion in bean paste (Miso).]** *Nippon Hoigaku Zasshi (Jap. J. Legal Med.)* 33(1): 46-54; 1979 (3 references) (Japanese).

Artificial specimens were prepared by mixing a commercial endrin emulsifiable concentration containing 19.5% of endrin into miso bean paste. Endrin in this specimen was determined by extraction with ethanol, followed by extracting the ethanol-extract with hexane in a Soxhlet extractor and then chromatographing the hexane-extract with alumina, and finally by infrared spectroscopy (the absorbance at 846 nm). The method is based on the utilization of one of specific infrared absorption bands, 1048, 885, 846, 742 and 715 nm. It was confirmed that the emusifier in the endrin emulsifiable concentration did not interfere with infrared spectroscopy. Content of endrin in several commercial endrin emulsifiable concentrates was, on the average, 20.77% and higher in older products. Similar methods applied to specimens artificially prepared by mixing a commercial DDT emulsifiable concentration are described.

80-0286. Choe, M. K. (Lab. Serv., Wellington Hosp., Wellington, New Zealand) **A rapid, simple method for plasma (serum) paraquat determination.** *N. Z. J. Med. Lab. Technol.* 32(3): 107; 1978 (1 reference).

To determine paraquat in plasma or serum protein and other macromolecules are precipated by organic solvents and ammonium sulfate. This step is followed by the addition of aklaline dithionite to the clear supernatant. Absorbance is determined at 396 nm within 15 min. The procedure is sensitive to 0.5 μmol/l.

80-0287. Gupta, H. C. L.; Kushwaha, K. S.; Kavadia, V. S. (Pestic. Residue Lab., Rajasthan Coll. Agric., Univ.

Udaipur, Udaipur, India) **Estimation of aldrin/dieldrin by bio-assay and spectrophotometric methods - a review of methodology.** *Pesticides* 13(7): 43-45, 48; 1979 (50 references).

A review is presented of the microbioassay and spectrophotometric assay methods for determination of aldrin and dieldrin. Houseflies, mosquito larvae, and *Drosophila melanogaster* have all been used as test organisms, with *Drosophila* proving to be the most practical and the most sensitive indicator organism. Rearing of *D. melanogaster* is discussed, along with methods for the sexing of flies and the separation of flies of known age. The phenylazide-photometric method is the most common for the detection of aldrin and dieldrin, but excellent results are also obtained with paper chromatography and gas chromatography.

80-0288. Lingaraja, T.; Venugopalan, V. K. (Cent. Adv. Study Mar. Biol., Annamalai Univ., Parangipettai, Tamil Nadu, 608502, India) **A simple method for the micro-estimation of carbaryl.** *Pesticides* 13(7): 46-48; 1979 (4 references).

A simple colorimetric method for the determination of carbaryl in aqueous suspensions is described. Carbaryl is hydrolyzed to α-naphthol, which is allowed to couple with diazotized sulphanilamide to produce a pink colored complex. Absorbance is measured in a Spectronic-20 Colorimeter at 525 nm. Maximum color production is achieved at a pH of 12-12.5. The method allows detection of 10-100 μg carbaryl.

80-0289. Prakash, S. R.; Vijayashankar, Y. N.; Visweswariah, K. (Infest. Control & Pestic. Discipline, Cent. Food Technol. Res. Inst., Mysore 570013, India) **Detection and determination of carbendazim (methyl-2-benzimidazole carbamate) by TLC.** *Pesticides* 13(7): 49-50; 1979 (9 references).

A thin-layer chromatography (TLC) method for the determination of the broad spectrum systemic fungicide carbendazim or methyl-2- benzimidazole carbamate (MBC) is described. After development, the plates were sprayed with the chromogenic reagent *O*-tolidine and potassium iodide, which enhances the detection limit. Recoveries ranged from 93.2% to 104%.

80-0290. Ghosh, S. K.; Gokani, V. N.; Thakker, M. N.; Patel, J. G.; Kashyap, S. K.; Chatterjee, S. K. (Natl. Inst. Occupat. Health, Ahmedabad 380016, India) **A comparative study on the different methods of nicotine estimation.** *Pesticides* 13(7): 56-58; 1979 (9 references).

In a comparative study, nicotine estimation was carried out using 3 different methods. The methods used were thin layer chromatography (TLC); distillation followed by ultraviolet spectroscopy; and extraction with n-heptane followed by ultraviolet spectroscopy. Recoveries were 100% with n-heptane extracts, 33.3% with distillation, and 39.9-69.9% with TLC, depending on the solvent system used.

80-0291. Uk, S. (Agric. Aviat. Res. Unit, Ciba-Geigy Unit, Cranfield Inst. Technol., Cranfield, Bedford MK43 OAL, England) **Time-controlled cholinesterase reactions as a means of measuring water-soluble residues of organophosphorus insecticide spray deposits on plant surfaces.** *Pestic. Sci.* 10(4): 308-312; 1979 (6 references).

Ellman's method of cholinesterase assay which is often used for residue analysis of organophosphorus insecticides has been modified by adding the protein denaturant, sodium dodecyl sulfate, to control the duration of the reaction. In doing so, the reaction time can be standardized to facilitate the measurement in a field laboratory of residues of water-soluble organophosphates, particularly on plant surfaces that have been subjected to sprays. Thirty samples can be analyzed in 1 hr by timing each step of the procedure for a series of 30 reaction tubes at 1 min intervals from the incubation of the enzyme with the insecticide to the final addition of the sodium dodecyl sulfate. Results from a series of aerial spray trials are presented and discussed briefly as an example of a field application of the method. (Author abstract by permission)

80-0292. Jones, P. (Plant Pathol. Dep., Rothamsted Exp. Stn., Harpenden, Hertfordshire, England) **Microscopy and image analysis in the study of plant pathogens and the application of pesticides.** *Pestic. Sci.* 10(4): 369-372; 1979 (16 references).

Problems associated with the preparation of diseased plant material for transmission electron microscopy (TEM) and the uses of TEM to meet the specific needs of plant virologists are discussed. Methods of collecting spray droplets for analysis by an image-analyzing computer method are described. (Author abstract by permission)

80-0293. Schooley, D. A.; Quistad, G. B. (Dep. Biochem., Zoecon Corp., Palo Alto, CA) **High-pressure, high resolution liquid chromatography and its application to pesticide analysis and biochemistry.** *Prog. Drug. Res.* 3: 1-113; 1979 (263 references).

The article presents the role of liquid chromatography (LC) in pesticide analysis. A general, non mathematical, discussion of LC is given including chromatographic theory and comparisons between gas-liquid chromatography (GLC) and LC. An overview is made of the modern application of LC to pesticide analysis such as metabolism studies, residue analysis and formula-

tions. Modern LC techniques are reviewed with emphasis on the techniques relevant to pesticide analysis. Apparatus is discussed in general terms, with special emphasis given to specific sensitive detectors. Application of LC to insecticides, herbicides, fungicides, rodenticides, phermomes, and mycotoxins are considered. Preferred techniques for LC analysis of different structural classes of pesticides are discussed. A table giving exact conditions for analysis of over 220 pesticides is also included. Work on residue analysis of pesticides subsequent to 1975 is reviewed. A literature coverage of multiresidue analysis through January 1978 is also given.

80-0294. Taylor, I. S.; Their, H. P. (Region. Lab. Victoria, Australian Govt. Anal. Lab., Melbourne, Victoria 3001, Australia) **Status report on clean-up and determination procedures.** *Pure Appl. Chem.* 51(7): 1605-1613; 1979 (85 references).

A review of some of the procedures for extraction and determination of pesticides was made and evaluations presented. Samples for determiniations included plant material, soils and fat. Recent studies on evaluating the effectiveness of solvents for extraction of samples are reviewed. Next, partitioning is discussed, in which various types of samples and the best reagents are reviewed. Absorbent column, gel permeation, and high performance liquid chromatography are reviewed, and the types of pesticides for which each is most efficient is presented. Trends in residue analysis, derivatization, columns, and computer processing in gas liquid chromatography and high performance liquid chromatography are discussed.

80-0295. Hill, K. R. (ARS, USDA, Beltsville, MD) **Recommended methods for the determination of residues of pyrethrins and piperonyl butoxide.** *Pure Appl. Chem.* 51(7): 1617-1623; 1979 (8 references).

A review is presented in which the authors examined and evaluated a variety of methods for analyzing biological samples for pesticide residues. Specific recommendations for the extraction, clean up, and analysis of milk, fish and meat, fat and meat by-products of domestic animals are summarized. Gas liquid chromatogaphy and thin layer chromatography methods of analysis for pyrethrin I, Cinerin I, pyrethrin II, Cinerin II and Jasmolin II are described.

80-0296. Steurbaut, W. (Inst. Rech. Chim., Minist. Agric., B-1980 Tervuren, Belgium) **Comparaison des tests biologiques aux methodes instrumentales analytiques utilisees pour la determination des residus de pesticides. [Comparison of biological tests with analytical instrumental methods for the determination of pesticide residues.]** *Rev. Agric. (Brussels)* 31(4): 641-661; 1978 (137 references) (French).

Biological and physiochemical methods for the determination of pesticide residues in different media are compared. Despite high sensitivity, reproducibility, and specificity, the physicochemical methods fail to furnish any information on the phytotoxicity or toxicity of pesticide residues on active metabolltes or to distinguish between the free and bound forms of the pesticides. Certain biological and biochemical tests have proved to be valuable as screening tests in the rapid qualitative detection of pesticides. They include the determination of fungicides by bioautography, the detection of insecticides by TLC enzyme inhibition tests, biological determination of fungicides on dressed seeds, and the determination of herbicides in water and soil using sensitive plants and algae. The biological test is, however, usually semiquantitative.

80-0297. Thielemann, H. (Wasserturmstr. 10, DDR-36 Halberstadt, DDR) **Nachweisemp findlichkeit von Hexachloro cyclohexan (Lindan) mit unterschiedlichen Spruhreagenzien an antivierten Fertiqfolien fur die Dunnschicht chromatographie. [Detection sensitivity of hexachloro cyclohexane (lindane) with different spray reagents on activated ready-made films for thin-layer chromatogrphy.]** *Sci. Pharm.* 46(4): 320-322; 1978 (3 references) (German).

The sensitivity of the TLC determination of lindane was studied with 5 different spray reagents, using activated ready-made foils. The detection limit was 4 μg with Rhodamine B sodium carbonate solution (spray reagent 1), 0.8 μg with diphenylamine (reagent 2) with UV light, 10 μg with silver nitrate fluorescein (reagent 3), 6 μg with bromocresol green (reagent 4), and 0.4 μg with ammoniacal silver nitrate solution (reagent 5) with UV irradiation. The lower limits of quantitative determination were 20 μg with reagents 1 and 4, 10 μg with reagent 2, and 1 μg with reagent 5. This value was not determined with reagent 3.

80-0298. Kawamura, Y.; Takeda, M.; Uchiyama, M. (Natl. Inst. Hyg. Sci., Setagaya-ku, Tokyo, Japan) **Studies on analysis of pesticide residues in foods. 27. Determination for multicomponent organophosphorus pesticides by gas liquid chromatography.** *Shokuhin Eiseigaku Zasshi (J. Food Hyg. Soc. Jpn.)* 19(6): 511-517; 1978 (17 references).

Conditions are established for analyzing most organophosphorus pesticides registered for use in Japan simultaneously by means of temperature programmed and subsequent isothermal GLC with two kinds of columns. The relative retention times of organophosphorus pesticides on three columns are listed. Sensitivities of organophosphorus pesticides under temperature programmed conditions on two columns are given. The retention times of organophosphorus pesticides on OV-101 and QF-1 at 5 different column temperatures are listed.

80-0299. Roche, Y.; Vigier, J.; Boucherle, A.; Cantin, D. (Lab. Chim. & Toxicol., UER, Sci. Pharm. & Biol. Grenoble, F-38700 La Tronche, France) **Recherche et dosage de l'amino-2- benzimidazole en milieu aqueux par polarographie. [Study on the determination of 2-amino-benzimidazole in aqueous medium using polarography.]** *Toxicol. Eur. Res.* 1(2): 109-112; 1978 (9 references) (French).

For the study and determination of 2-amino- benzimidazole in an aqueous medium, an original quantitative and qualitative method based on polarography, with + or - 5% precision was proposed. A rotating platinum electrode oxidized the molecule of 2-amino- benzimidazole. The potentials explored ranged from +0.5 V to +1.4 V. A solution of 2-amino- benzimidazole containing 5 x 10^{-4} mol/l was used for a study according to pH (1 to 12). As the pH increased, the polarographic wave became more and more varied. At pH 1, the wave remained well defined, even for higher concentrations; so, this value was chosen for all measurements. The study involved concentrations of 10^{-2} mol/l and 10^{-5} mol/l. Sensitivity depended upon tne performance of the apparatus. The method proved applicable to lengthy and systematic experimentation with complex media such as tap, river or aquarium water.

80-0300. Zhemchuzhin, S. G.; Momotenko, V. A. (All-Union Sci. Res. Inst. Phytopathol., Moscow, USSR) **Spektro fluorometricheskoe opredelenie submikrogrammovykh kolichestv 4-amino- 3,5,6- trikhlorpikolinovoy kisloty (gerbitsid pikloram) po reaktsii s sernoy kislotoy. [Spectro fluorometric determination of submicrogram amounts of 4-amino- 3,5,6- trichloro picolinic acid (herbicide picloram) by its reaction with sulfuric acid.]** *Zh. Anal. Khim.* 33(10): 2014-2018; 1979 (18 references) (Russian).

A spectro fluorometric method for the determination of < μg amounts of 4-amino- 3,5,6- trichloro picolinic acid (picloram) is described. The method is based upon the fluorescence emitted by picloram during its reaction with concentrated sulfuric acid. The excitation and emission spectra were measured at 318 nm and 470 nm, respectively. The lower analytical limit was found to be 0.1 μg/ml; the fluorescence obtained at this concentration was twice as high as the background value. Silvex, 2,4-D, 2,4,5-T, 2,4-D butyl ester, isopropyl- *N*- (3-chlorophenyl) carbamate, Dacthal (DCPA), propanil, propazine, simazine, atrazine, diuron, monuron, Banval (dicamba) dichlobenyl, prometryne, trifluralin, paraquat, diquat, and cacodylic acid did not interfere with the determination of picloram.

See also 80-0014, 80-0090, 80-0093, 80-0109 *and* 80-0219.

☆ U. S. GOVERNMENT PRINTING OFFICE : 1980--620-372/8

The Administrator of the U.S. Environmental Protection Agency has determined that the publication of this periodical is necessary in the transaction of public business required by law of this Agency. Use of funds for printing this periodical approved by the Director of the Office of Management and Budget February 6, 1973.

Pesticides Abstracts is available on 16 mm microfilm. Additional information can be obtained from the Technical Services Division.

ORDER FORM FOR
PESTICIDES ABSTRACTS

To: Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

Please enter my subscription for Pesticides Abstracts. I am enclosing Money Order ☐ Check ☐ for this subscription.
($21.00 a year; $5.25 additional for foreign mailing.)

Please address as follows: _____

_____

_____

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON, D.C. 1968

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Subscription price, domestic, $21.00 a year, $5.25 additional for foreign mailing. Price for a single copy of this issue is $1.60, Index issue $2.35.

United States
Environmental Protection
Agency

Official Business
Penalty for Private Use
$300

TS-793: Rm: E-447

Washington DC 20460

Fourth-Class Mail
Postage and Fees Paid
EPA
Permit No. G-35

3EPAAPP8 00001 00136453500 001
SERIALS DEPT
XEROX UNIVERSITY MICROFILMS
300 NORTH ZEEB ROAD
ANN ARBOR MI 48106